Dissertation

On

CYBERCRIME AS AN EMERGING MENACE IN THE BANKING SECTOR, THE ISSUES AND THE CHALLENGES WITH SPECIAL REFERENCE TO INDIA

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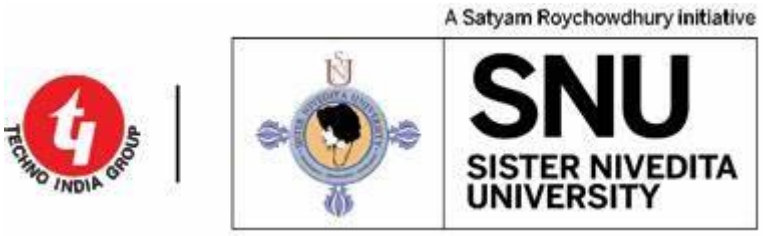

School of Law

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2025

DECLARATION BY THE STUDENT

I hereby declare that the work which is being presented in this dissertation entitled "**CYBERCRIME AS AN EMERGING MENACE IN THE BANKING SECTOR, THE ISSUES AND THE CHALLENGES WITH SPECIAL REFERENCE TO INDIA.**" in partial fulfilment of the requirements for the award of the degree of Masters of Law in Corporate Law is an authentic record of my own work carried out during the 4th semester under the supervision of Dr. Susmita Dhar, department of Law, Sister Nivedita University.

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GUIDE'S CERTIFICATE

This is to certify that the dissertation titled "**CYBERCRIME AS AN EMERGING MENACE IN THE BANKING SECTOR, THE ISSUES AND THE CHALLENGES WITH SPECIAL REFERENCE TO INDIA** submitted by Uttara Sengupta (Enrollment number 2222215005018) is in partial fulfillment for the degree of Master of Law (LL.M) of Sister Nivedita University under the guidance and supervision of Dr. Susmita Dhar (Assistant Professor).

This research has not been submitted for the award of any other degree either in this university or in any other university.

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PREFACE

In an era where digital transformation is reshaping industries, the banking sector stands at the forefront of both innovation and vulnerability. My journey into the intricate world of cybercrime within the banking sector began with a profound realization: as financial institutions increasingly embrace technology, they also become prime targets for cybercriminals. This dissertation delves into the multifaceted nature of cybercrime affecting banks, exploring its impact, challenges, and the evolving strategies employed to combat it.

The motivation behind this research stems from a combination of personal fascination and professional concern. Witnessing the rapid advancements in financial technologies alongside rising incidents of cyber threats has driven me to investigate how these dynamics intersect and influence the security of financial systems. This exploration is not only a scholarly pursuit but also a reflection of my commitment to understanding and mitigating one of the most pressing issues in contemporary banking.

Embarking on this research was both an exhilarating and daunting endeavour. The complexity of cyber threats and their implications for financial stability presented numerous challenges. I navigated through vast amounts of data, analysed sophisticated attack vectors, and engaged with leading experts to gain a comprehensive understanding. This process has been a transformative experience, deepening my expertise and honing my analytical skills.

This dissertation aims to illuminate the critical issues surrounding cybercrime in the banking sector and provide actionable insights for enhancing security measures. By examining the current landscape, identifying vulnerabilities, and evaluating countermeasures, I hope to contribute meaningfully to the discourse on protecting financial institutions from cyber threats.

As I conclude this research, I am optimistic that the findings and recommendations presented here will serve as a valuable resource for policymakers, industry practitioners, and academics alike. The ongoing battle against cybercrime demands continuous vigilance and innovation, and I am hopeful that this work will inspire further efforts to safeguard the future of banking.

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Mere words can never be sufficient to express gratitude to those whose consistency was indispensable in completing the dissertation work. This research work would not have been possible without the guidance of Dr. Susmita Dhar, Assistant Professor of Law, at Sister Nivedita University. She is a constant source of guidance and inspiration throughout this research work and without her the dissertation would not have been possible.

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LIST OF ABBREVIATIONS

APT – Advanced Persistent Threat

APWG -Anti-Phishing Working Group

ASV - Approved Scanning Vendor for PCI

AML – Anti-Money Laundering

AV – Antivirus

BAC - Breach and attack simulation

CNP – Card Not Present Fraud

CIRT - Computer Incident Response Team

CEH - Certified ethical hacker

CTI – Cyber Threat Intelligence

DDoS – Distributed Denial of Service

DAST - Dynamic Application Security Testing

DC - Domain controller

DoS - Denial of service

ERM - Enterprise Risk Management

FATF – Financial Action Task Force

GDPR – General Data Protection Regulation

IoC – Indicators of Compromise

IDS/IPS – Intrusion Detection System / Intrusion Prevention System

ISSO - Information Systems Security Officer

ISSPM - SInformation Systems Security Project Manager

IoT – Internet of ThingsEMV – Europay, Mastercard, and Visa (Chip-based card security standard)

KYC – Know Your Customer

MITM – Man-in-the-Middle Attack

MFA – Multi-Factor Authentication

NCSA - National Cyber Security Alliance

NIST - National Institutes of Standards and Technology

OTP – One-Time Password

P2P – Peer-to-Peer Transactions

PCI DSS – Payment Card Industry Data Security Standard

RAT – Remote Access Trojan

SQLi – SQL Injection

SOC – Security Operations Center

SA - Situational Awareness

SIEM – Security Information and Event Management

SOC – Security Operations Center

TAN – Transaction Authentication Number

XSS – Cross-Site Scripting

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CYBERCRIME AS AN EMERGING MENACE IN THE BANKING SECTOR, THE ISSUES AND CHALLENGES WITH SPECIAL REFERENCE TO INDIA.

Chapter 1: Introduction

1.1 Introduction

The banking industry in India has rapidly changed in the current, more digitalised economy, adopting fintech technologies, online payments, and mobile banking. Although this development has increased efficiency and convenience, it has also made the industry more vulnerable to serious cyberthreats. The frequency of cybercrimes targeting banks has risen significantly, ranging from ransomware and phishing attacks to large-scale data breaches and financial fraud. India, among the fastest-growing digital economies, faces heightened vulnerability due to its surge in new internet users and an evolving cybersecurity infrastructure. The importance of banks in preserving both public trust and economic stability makes research on cybercrime in Indian banks necessary. Sensitive financial and personal information is held by financial institutions, and any compromise could result in significant financial loss, harm to the institutions' reputation, and a drop in consumer trust. Furthermore, there is an urgent need for strong frameworks to identify, stop, and effectively respond to such attacks as hackers use ever-more-advanced tactics. Policymakers, financial institutions, and cybersecurity specialists may tighten regulatory frameworks, increase consumer digital literacy, and create more resilient systems with the aid of a targeted study on cybercrime in the banking sector. To understand the trends, techniques, and offenders involved in cybercrime, it is essential to examine it within this framework. This analysis helps evaluate existing security protocols, identify vulnerabilities in digital systems, and assess the readiness of financial institutions to counter such threats. Additionally, the study supports the formulation of robust cybersecurity regulations, laws, and policies tailored to the banking sector.

The Digital Personal Data Protection (DPDP) Act, 2023, along with the Bharatiya Nyaya Sanhita (BNS) and Bharatiya Nagarik Suraksha Sanhita (BNSS) amendments to criminal and procedural laws, reflects a major shift in India’s strategy to tackle cybercrime. The DPDP Act specifically regulates the handling and safeguarding of personal data, a critical aspect of banking activities. Meanwhile, the BNS and BNSS redefine offenses and establish procedures to prosecute cybercrimes more effectively. Cybercrime in the banking industry affects national security and economic stability in addition to being a business issue. Large-scale cyberattacks have the potential to disrupt services, destabilise markets, and even aid in the financing of terrorists and money laundering because banks are essential infrastructure. The formulation of

national cybersecurity plans can be guided by a comprehensive understanding of how cyber dangers can interact with wider economic and security objectives, which is made possible by studying cybercrime.

The growing digital footprint of the Indian banking industry, the sophistication of cyberthreats, customer ignorance gaps, and changing legislative frameworks make it necessary to research cybercrime in this sector. Strengthening cybersecurity procedures, influencing legislation, improving regulatory compliance, and eventually guaranteeing a safe and reliable financial environment all depend on this kind of study. Proactive study and analysis of cybercrime in banking will be essential to protecting India's financial ecosystem as it moves closer to being a digitally empowered economy.

1.2 Cybercrime and its Relation with the banking sector[1]

This is true because the banking industry has not been left out in the rampant cases of cybercrimes. The RBI has given the meaning of bank fraud as; 'A misrepresentation or concealment of material facts, whether by omission or commission, committed consciously by any person in relation to banking business and the books of account maintained manually or under computer systems in banks leading to wrongful gain to any person for a temporary period or otherwise, with or without causing loss to the bank'.

1.3 E-banking:-

Electronic banking involves utilizing data and computer technologies to operate banking systems, eliminating the need for direct human involvement. Clients and banks do not engage in in-person interactions; instead, services and data are delivered via e-banking platforms using devices like PCs, mobile browsers, desktop applications, telephones, or smart TVs. Additional e-banking methods comprise ATMs, credit/debit cards, real-time gross settlement (RTGS), mobile commerce, and internet banking.

The rise of e-banking has revolutionized financial services by offering convenience, speed, and accessibility, but it has also created new opportunities for cybercrime. As more customers rely on online transactions, mobile banking, and digital payments, cybercriminals increasingly target these platforms to exploit vulnerabilities such as weak authentication, phishing scams,

[1] Concept of cybercrime in the banking sector, https://www.ezylegal.in/blogs/concept-of-cybercrime-in-the-banking-sector(oct 06/2024)

and malware attacks. E-banking systems store vast amounts of sensitive data, including account details and personal information, making them prime targets for identity theft, fraud, and ransomware attacks. While banks implement advanced security measures like encryption and biometric verification, cybercriminals continuously evolve their tactics, using social engineering, AI-driven scams, and zero-day exploits to bypass defenses. The growing adoption of e-banking has thus expanded the attack surface, requiring financial institutions to invest in stronger cybersecurity frameworks, real-time monitoring, and customer awareness programs. Despite these challenges, e-banking remains essential for modern finance, meaning the fight against cybercrime must remain a top priority to ensure secure and trustworthy digital banking experiences.

1.4 Categories of cybercrime occurring in the banking sector[2]:-

• Malware-based attacks: This proves that among all the internet threats affecting the electronic financial system, Malware-based attacks are the most threatening. Such forms of attacks generate damaging codes into the target systems. Indeed, one must state that, nowadays, the financial industry faces a frequent problem of malware attacks.

• ATM Manipulation: One of the ways to hack these types of machines is to fix a skimming device on the top of the ATM or point of sale system making it seem real or fix one on the card reader making it look like it is part of the engine.

• Phishing: "Phishing scams involve sending fraudulent emails disguised as legitimate organizations to trick recipients into revealing sensitive details like credit card numbers, debit card details, customer IDs, CVV codes, and other personal information."

• Pharmacy: It is the practice of employing the internet in deceiving clients into accessing a website that is identical to a bank. The attackers undertake this through a process of redirection of the URL of the respective bank's website.

• Spyware: It is the most common method of obtaining login details to banking accounts and subsequently conduct fraudulent activities.

• Viruses: It is a type of virus that replicates itself in papers or executable code in order to spread infection. A virus can be defined as a hardware or software element that infects an

[2] Concept of cybercrime in the banking sector, https://www.ezylegal.in/blogs/concept-of-cybercrime-in-the-banking-sector(oct 06/2024)

executable file and makes the sick file perform different or undesired tasks. Properly, it propagates through incorporation into the operating systems and executable files such as program files.

• Hacking: Cybercrime refers to illegal activities conducted through computer networks, with hacking being one such form. This occurs when an individual tries to bypass authorization codes, gain unauthorized entry into accounts or banking websites, or infiltrate restricted systems without permission..

• Logging keys: It is dubbed as the “keystore logging or keyboard capture”. it is a technique of capturing what is typed on the keyboard such that the user himself or herself is not in a position to realize that their activities are being monitored. They pointed out that banking information and other sensitive information can be stolen by the dangerous approaches.

1.5 Reasons for cybercrime in banks :-

Cybercrime targeting banks is driven by several key factors, with financial gain being the primary motivator. Banks store vast amounts of sensitive data, including customer account details, credit card information, and large sums of money, making them lucrative targets for cybercriminals. The increasing digitization of banking services, including online transactions and mobile banking, has expanded the attack surface, providing hackers with more opportunities to exploit vulnerabilities. Additionally, cybercriminals are often drawn to banks due to the potential for high rewards with relatively low risk, as many attacks can be conducted anonymously from remote locations. Weak cybersecurity measures, outdated software, and poor employee training further encourage attacks, as criminals exploit these weaknesses to gain unauthorized access. Another reason is the rise of sophisticated cybercrime tools, such as ransomware and advanced phishing schemes, which make it easier for attackers to bypass traditional security defences. Insider threats, whether from disgruntled employees or negligent staff, also contribute to cybercrime in banks. Finally, geopolitical motivations and organized crime play a role, as state-sponsored hackers and criminal syndicates target financial institutions to fund illegal activities or destabilize economies. These factors collectively make banks a prime target for cybercrime, necessitating strong defensive measures to mitigate risks.

1) Indeed, the advancement of computer technology is such that it becomes possible to penetrate a particular system at several places and ways implying that it becomes very difficult to protect such a system against intrusion. Malicious individuals and organizations can easily

Acquire access codes, capture retinal scans, employ high-quality voice recorders, and utilize devices capable of bypassing biometric security; these methods breach firewalls and can penetrate multiple protective barriers.

2) Able to contain information in a relatively rather limited extent, by this, it means that it can store the information in a small space. Individuals will be able to easily carry out unauthorized access of other storage systems to extract useful data and use it for their own benefit as will be seen.

3) Creating a computer is not an easy task: A computer with windows operating system is hundreds of thousands, if not millions, of lines of code. Incompetencies are bound to occur at any one time because man and his mind are excessively frail. This is an area that Cybercriminals could exploit. Explain reasons

1.6 Strategies for the protection of the banking sector:-

Protecting banks from cybercrime requires a multi-layered approach that combines advanced technology, employee training, and strict regulatory compliance. One key strategy is implementing robust cybersecurity frameworks, such as encryption, multi-factor authentication (MFA), and intrusion detection systems (IDS), to safeguard sensitive data and prevent unauthorized access. Banks must also conduct regular vulnerability assessments and penetration testing to identify and address weaknesses in their systems. Additionally, employee awareness programs are crucial, as human error remains a leading cause of security breaches; staff should be trained to recognize phishing attacks, social engineering tactics, and other common threats. Collaboration with cybersecurity firms and government agencies can further enhance threat intelligence and response capabilities. Compliance with regulations like the General Data Protection Regulation (GDPR) and the Payment Card Industry Data Security Standard (PCI DSS) ensures adherence to best practices. Finally, banks should establish incident response plans to quickly mitigate damage in case of a breach, including real-time monitoring, forensic analysis, and customer notification protocols. By adopting these strategies, financial institutions can significantly reduce their risk of cyberattacks and maintain customer trust.

- Establishing stringent corporate policies that ensure secure data protection.
- Along with ensuring employee safety protocols, they are implementing necessary safeguards like password protection, user authentication, and login activity

tracking.The sharing of protected information is prohibited and each employee is given their user.

- Limit the installation and download of any illegal software by employees.
- It guarantees that the proper approval processes are followed with a minimum of two approval requirements for operations such as wire transfers and clearing transfers.
- Increasing technical assistance will guarantee that every device has sufficient firewall defence. Any contacts from unauthorized websites will be blocked

1.7 How cyber law benefits the banking sector[3]: -

Cyberlaws play a crucial role in safeguarding the banking sector by establishing legal frameworks that deter cybercrime, protect sensitive data, and ensure secure digital transactions. These laws mandate strict cybersecurity standards, requiring banks to implement robust encryption, multi-factor authentication, and regular security audits to prevent breaches. By criminalizing unauthorized access, identity theft, and financial fraud, cyberlaws act as a deterrent, discouraging hackers and malicious actors from targeting financial institutions. Additionally, regulations such as the General Data Protection Regulation (GDPR) and the Payment Card Industry Data Security Standard (PCI DSS) ensure that banks handle customer data responsibly, reducing the risk of leaks and identity theft. Cyberlaws also facilitate swift legal action against cybercriminals, enabling banks to recover losses and maintain trust with customers. Furthermore, these laws promote international cooperation in combating cyber threats, helping banks address cross-border cybercrimes more effectively. By enforcing accountability and transparency, cyberlaws enhance customer confidence in digital banking, fostering innovation and growth in the financial sector while minimizing risks associated with cyber threats.

Because banking services have become widely digitalized, there is an unstated mutual benefit between the banking industry and cybercrime. Today 40% of all online banking transactions worldwide take place in India thanks to QR codes, UPI, and online banking payments.

[3] Concept of cybercrime in the banking sector https://www.ezylegal.in/blogs/concept-of-cybercrime-in-the-banking-sector(09/2024)

The following are some crucial facets of the banking industry and cyber law:-

- **Data protection:** - To protect client data, banks and financial organizations must establish strong information security measures, such as data encryption, limited access controls, and periodic compliance audits, as required by cybersecurity laws.
- **Incident response strategies: -** Cyber law mandates that banks create incident response strategies, notify regulatory authorities of cyber events as soon as possible, and assist with investigations.
- **Protection of customers: -** Cyberlaw upholds laws about identifying theft, unauthorized transactions, and online banking crime, guaranteeing that clients are shielded from cybercrimes.
- **Legal framework: -** by guaranteeing the customer's digital transactions and data are protected by legislation, cyber law offers a legal basis for the digitalization of the banking industry.
- **Cyber Security Education and Awareness: -** cyberlaw advocates banks to provide frequent education sessions and inform staff members and clients on safe online conduct, potential security risks, and reporting guidelines.

1.8 Review of the literature:-

Amlan Jyoti Baruah and Animesh Sarmahand (2017): Cybercrime, according to the authors of this article, is the term for illegal activity or crimes engaging the internet. The term "Cyber Law" was coined to deter or punish cybercriminals. According to the authors, the area of law that addresses the Internet, cyberspace, and legal matters is known as cyber law. Freedom of expression, Internet access and use, online security, and online privacy are just a few of the many secondary themes it covers.

According to **Anuraj Singh (2007),** India's cyber law requires such regulations so that consumers can use credit cards to make purchases online without worrying about fraud. To guarantee that electronic records maintain their legal validity and enforceability, the law establishes an appropriate regulatory framework. Cybercrime has become an inevitable, widespread phenomenon that intersects with multiple spheres of criminal behaviour. This digital environment, governed to ensure equitable access to information for all users, emerges from technological advancements and interconnected networks. The misuse of internet-enabled technologies has gradually led to the rise of cybercrime. Fundamentally, cybercrime constitutes illegal activities that lead to criminal consequences. Cybersecurity is a method for safeguarding

data about computers and other devices from unlawful and unauthorised entry. This paper discusses and provides examples of cybercrime, its effects on society, the many kinds of threats, and cybersecurity. The issues of cybercrime and theft have grown more apparent in the modern era, especially those about identity theft, childcare, copyright infringement, piracy, and child pornography.[4]

McKinsey (2023) estimated that cybercrime costs banks $2.9 million per attack on average. The World Economic Forum (2024) ranked cyberattacks as a top-5 global risk for financial stability. Deloitte (2023) found that 60% of customers lose trust in banks after a data breach. Pwc (2022) reported that banks spend millions on PR recovery post-cyber incidents. GDPR & PCI-DSS fines have increased, with banks paying up to 4% of global revenue for security lapses (EU Report, 2023).FFIEC (2023) mandates stricter cybersecurity frameworks for banks. JPMorgan Chase (2023) uses AI to detect real-time transaction anomalies. Forrester (2024) predicts that 75% of banks will adopt AI-driven security by 2025. Santander Bank (2022) implemented blockchain to prevent fraud in cross-border payments. Gartner (2023) suggests blockchain reduces fraud risks by 40%. Microsoft (2023) found that banks using ZTA saw a 50% drop in breaches. NIST (2024) recommends ZTA for financial institutions to prevent unauthorised access.

Federal Reserve (2023) emphasised that **90% of attacks** can be prevented with employee & customer cybersecurity training. **RBI (2024)** launched campaigns to educate users on phishing scams. **Lack of Global Cybersecurity Standards**: Differences in regulations make unified protection difficult **vs. AI Cyber Wars**: Hackers now use AI to bypass security, requiring stronger defences. **Quantum Computing Threats**: Future risks include quantum-powered decryption of banking systems

Rao and Suvarchala (2018) focused on how consumers felt about banking services after demonetisation. The study revealed that customers face considerable challenges accessing banking services, and noted that post-demonetization, their perception of financial services has dramatically transformed. They also disclosed that the problem of non-performing assets (NPAs) is one of the major obstacles the Indian banking industry faces.[5]

[4] Prof. Saquib Ahmad Khan, International Journal of Scientific & Engineering Research Volume 11, Issue 5, May-2020 691 ISSN 2229-5518

[5] Analysis of cyber-crime effects on the banking sector using thebalanced score card: a survey

Kumar & Kumar (2020) found that phishing remains the most common attack, where fraudsters impersonate banks to steal credentials. APWG (2023) reported a 45% increase in phishing attacks targeting financial institutions since 2021. Symantec (2022) highlighted that banking trojans (e.g., Zeus, Emotet) infect systems to steal login details. IBM Security (2023) noted a rise in ransomware attacks locking bank databases until a ransom is paid. Verizon DBIR (2023) revealed that 30% of banking cyber incidents involve internal employees misusing access. Accenture (2022) found that weak internal controls increase fraud risks in digital banking. FireEye (2021) identified state-sponsored hackers targeting banks for financial espionage. Kaspersky (2023) reported APTs using AI-driven attacks to bypass security systems.

Sujatha (2017) examined the evolution of e-banking services, customers' awareness of digital banking facilities before demonetization, and governmental efforts to promote cashless transactions. The study found that banks actively educated clients about digital payment systems pre-demonetization via training programs, awareness drives, and comparable activities. Following demonetization, internet banking users have become more apprehensive about data protection and privacy matters**. Alwan and Al-Zubi's (2016)** research emphasized how Jordanian commercial banks must prioritize security and privacy issues due to rising cyber threats. Since the internet functions as a worldwide system vulnerable to attacks and unauthorized access, financial organizations need strong security frameworks to protect sensitive customer data**. Alagarsamy and Wilson (2013)** noted that banking services are evolving to counter cyber threats while meeting clients' dynamic needs and preferences to maintain competitiveness. Customers expect high standards from banks, especially concerning safety, precision, and efficiency. Nevertheless, banks continuously adopt technological advancements and creative approaches to satisfy client demands and gain market advantage by expanding their reach, attracting new customers, and retaining existing ones.[6]

Kweyu and Ngare (2013) conducted research examining Kenyan users' attitudes toward mobile banking services. The study identified key adoption factors, including customer perceptions and mediating demographic variables, which might operate differently in emerging

of literature,Oluwatoyin Esther Akinbowale,Heinz Eckart Klingelhöfer and Mulatu Fekadu Zerihu, Journal of Financial CrimeVol. 27 No. 3, 2020

[6] Analysis of cyber-crime effects on the banking sector using thebalanced score card: a survey of literature,Oluwatoyin Esther Akinbowale,Heinz Eckart Klingelhöfer and Mulatu Fekadu Zerihu, Journal of Financial CrimeVol. 27 No. 3, 2020

economies compared to developed nations. Findings also revealed no gender-based variations in preferences concerning online banking's perceived convenience and associated risks..[7]

Furthermore, Research conducted by **Malik et al. (2018)** revealed that cybercrimes negatively affected both the performance and trustworthiness of Pakistani financial institutions. The results further indicate that regulatory measures somewhat reduce cybercrime consequences. Nevertheless, the study was unable to pinpoint exactly which aspect of bank operations in Pakistan suffered most from cyber threats.

Ali et al. (2017) investigated the impact of cyber risks on customer perceptions of digital banking and revealed that merely 31% of participants recognized the specific cyber threat types listed in their study. This indicates that approximately 70% of online banking users lacked awareness of these dangers. The knowledge gap likely stems from inadequate education and limited understanding across all customer segments. Fraudsters exploit this vulnerability to harvest personal data from unsuspecting users for illegal activities.

Tariq (2018) analysed cyberattack cases across five continents to assess their impact on banking institutions. The findings revealed that cyberattack-related damages fall into two distinct classifications: immediate financial losses and secondary consequences. Direct impacts include fund theft and information leaks, while indirect effects encompass client dissatisfaction and reputational harm. However, the research proposed mitigation strategies to combat cyber threats in banks, comprising rigorous internal controls, security audits, risk evaluations, and staff awareness programs**. Arcuri et al. (2017)** analysed the impact of data breaches and cyberattacks on corporate stock performance. The study revealed that financial institutions experience more severe consequences than other organizations, with substantial negative market reactions following cybersecurity incident disclosures. Additionally, the research found that public, non-confidential cyber incidents prove most damaging, especially for the financial sector.

Balan et al. (2017) further stressed that enhancing internal controls is essential to avoid security deficiencies. They noted that some organisations have become immune to fraud because of the implementation of strong internal control measures; therefore, organisations will

[7] Analysis of cyber-crime effects on the banking sector using thebalanced score card: a survey of literature,Oluwatoyin Esther Akinbowale,Heinz Eckart Klingelhöfer and Mulatu Fekadu Zerihu, Journal of Financial CrimeVol. 27 No. 3, 2020

be able to combat cyber fraud more effectively and proactively if internal control measures are consolidated or reinforced.

Al-Suwaidi et al. (2018) examined factors influencing cybercrime by assessing attack rates in ten countries (Belgium, Canada, China, India, Italy, Japan, Spain, the Netherlands, the UAE, and the US) between 2005-2017. The study revealed that unemployment had no meaningful relationship with cyber offenses in Belgium, China, Italy, the US, or the UAE. These findings imply that the pattern may result from various nation-specific economic values and cultural attributes.

Kshetri (2015) asserts that the main economic and social features of India, such as its dual economy and low income and educational levels, are directly linked to the country's high unemployment rates and high significance level. These elements lead to reduced human development indicators, greater wealth disparity, and fragile democratic governance structures. Kumudha and Rajan (2018) performed an extensive analysis of cybersecurity issues.

Kumudha and Rajan's (2018) in-depth analysis of banking sector phishing impacts revealed that escalating cybercrime rates and complex investigation procedures demand appropriate preventive strategies.

Malik et al. (2018) found that cyber offenses negatively impact Pakistani financial institutions' operational effectiveness, with damage levels varying between 60-and 80%.

Malik and Islam (2019) explored how information security awareness helps combat cyber fraud, strengthens customer data safeguards, and improves operational productivity in Pakistan’s banking industry. The study indicates that cyber fraud has undermined both trust and functional efficiency in financial institutions. However, properly implemented awareness initiatives have successfully mitigated these negative effects.[8]

According to a 2018 UK Finance report, hackers infiltrated Bangladesh Bank's IT infrastructure, gaining unauthorized access to its payment platform connected to the SWIFT network. The perpetrators attempted 35 fraudulent transactions targeting fund transfers to Sri Lanka and the Philippines, but anti-fraud mechanisms successfully blocked 30 of these transactions. Over time, cybercriminals have employed diverse strategies targeting banks, such

[8] Analysis of cyber-crime effects on the banking sector using thebalanced score card: a survey of literature,Oluwatoyin Esther Akinbowale,Heinz Eckart Klingelhöfer and Mulatu Fekadu Zerihu, Journal of Financial CrimeVol. 27 No. 3, 2020

as phishing campaigns, identity spoofing, and unauthorized account access. These methods have enabled the unlawful acquisition of confidential information and security breaches within financial organizations.

Njeru and Gaitho's (2019) research revealed that 95% of participants recognized cybercrime as a major banking threat, with only 5% dissenting. Most respondents considered cybersecurity insurance costs for protecting customers and financial institutions against online risks prohibitively expensive, possibly limiting sector growth and technological advancement. The study additionally revealed that financial institutions incurred substantial fees to maintain IT regulatory compliance, with particularly elevated expenditures for prevention and detection systems, ultimately leading to diminished profit margins**.** Cybercrime, according to **Hunton (2009**, p. 532), is "a crime committed through the use of an electronic medium involving cyberspace." Cyber breaches include creative communications and fact-finding techniques that are carried out quickly and precisely and require significant forensic and investigative skills.

According to the **PwC (2018)** worldwide Report, which looked at cybercrime from a worldwide perspective, 48% of businesses that provide financial services are at risk of economic crime.The study further revealed South Africa ranked second among the top 15 countries for economic crime (70% incidence rate), with respondents concurring its law enforcement lacks adequate preparedness to combat cyber threats..[9]

The **KPMG (2019)** Global Banking Fraud Survey categorizes ten fraud varieties: scams, identity theft, impersonation, data breaches, internal fraud, cyber fraud, mortgage fraud, financial misrepresentation, rogue trading, and merchant fraud. The study, covering over 50% of respondents from America, EMA, and Asia-Pacific, revealed that cyber fraud constituted under 25% of total financial losses.

Studies by **Böhme and Moore (2012)**, **Arachchilage and Love (2014)**, and **Wada and Odulaja (2012)** demonstrate that technological advancements, while enabling financial institutions to gain a competitive edge through internet and ICT reliance, also create vulnerabilities for criminal exploitation. These innovations introduce security threats, including unauthorized access to confidential banking data. **Anderson et al. (2013)** empirically confirmed that global financial entities incur billions in losses annually from direct and indirect

[9] Analysis of cyber-crime effects on the banking sector using thebalanced score card: a survey of literature,Oluwatoyin Esther Akinbowale,Heinz Eckart Klingelhöfer and Mulatu Fekadu Zerihu, Journal of Financial CrimeVol. 27 No. 3, 2020

cyberattacks, underscoring the need for sustainable countermeasures. Additionally, **Ali et al. (2017)** projected that financial firms will remain prime cybercrime targets, with potentially devastating economic consequences over the coming decade.

Gady and Austin (2010) maintain that Africa's digital domain may serve as both a catastrophic weapon and an international security threat. A 2016 African Union Commission assessment recognized eleven nations - Botswana, Cameroon, Côte d'Ivoire, Ghana, Mauritania, Mauritius, Nigeria, Senegal, Tanzania, Uganda, and Zambia - as having established specific cybercrime legislation. Furthermore, twelve additional countries have partially adopted pertinent legal structures, with numerous others having draft cybercrime bills under legislative consideration.[10]

Initial studies on Indian cybercrime primarily centered on the Information Technology Act, 2000 (IT Act), the cornerstone of digital legislation. Although the IT Act covered various cyber offenses, including hacking, identity theft, and data breaches, authors like **Singh (2016) and Sharma (2019)** pointed out that it lacked comprehensive enforcement tools and flexibility to accommodate emerging forms of digital crime. Calls for revised legal frameworks that can address sophisticated crimes like deepfakes, AI-generated frauds, and widespread data exploitation were sparked by these constraints.

Scholars have started examining how the classification and prosecution of cyber offences have changed since the Bharatiya Nyaya Sanhita (BNS) replaced the Indian Penal Code (IPC). The BNS offers more explicit rules for crimes that are assisted by digital technology, such as electronic forgery, cyberstalking, and technological impersonation, according to recent legal assessments **(e.g., Rajan & Menon, 2024).** By acknowledging cyber-enabled offences as essential to contemporary criminal jurisprudence, the BNS seeks to close the legal gap and depart from the IPC's conventional, frequently analog-focused methodology.

Another significant procedural change is the Code of Criminal Procedure (CrPC) being replaced by the Bharatiya Nagarik Suraksha Sanhita (BNSS). Legal experts like **Iyer (2024) and Kumar (2023)** have noted that BNSS incorporates features for managing digital evidence and conducting investigations more quickly, both of which are essential in cybercrime cases. It improves the procedural robustness needed in cybercrime investigation and prosecution by

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introducing timelines for bringing charges, regulations for the admissibility of electronic evidence, and increasing the use of digital technologies in law enforcement.

The Digital Personal Data Protection (DPDP) Act, 2023, represents significant progress in cybercrime governance, especially concerning data privacy and obligations of data fiduciaries (including financial institutions). This legislation establishes a modern regulatory structure for data security, mandating explicit consent, limited data collection, and fiduciary accountability, according to academics like **Joshi (2023) and Banerjee (2024).** Additionally, it establishes sanctions for breaches and unlawful data processing, which have an immediate effect on how banks manage customer information. This regulation signals a move towards user-centric data governance by bringing Indian cyber law into compliance with international norms such as the GDPR.

1.9 Gap analysis:-

These are the gaps found**:-** Sophisticated machine learning and artificial intelligence threat detection systems.Minimising insider threats through the use of a zero-trust architecture.Improved incident response strategies with immediate mitigation and real-time monitoring.Blockchain technology integration for safe transactions.Expanded consumer education initiatives on preventing cybercrime.

The bank's defences against cyberattacks will be strengthened, financial and reputational risks will be decreased, and compliance with changing security standards will be enhanced if these holes are filled. Keeping up with cybercriminals requires constant investment in cybersecurity innovation.

1.10 Research problem

Rapid banking service digitisation has raised cyberthreats, resulting in data breaches, financial losses, and a decline in client trust. Banks still have to deal with sophisticated cyberattacks like ransomware, phishing, and insider threats despite security measures and regulatory frameworks. Finding weaknesses in the cybersecurity procedures in place and creating preventative measures to lessen risks are the difficult parts. The purpose of this study is to evaluate the efficacy of current security protocols, identify vulnerabilities in cyber resilience, and suggest creative ways to improve cybersecurity in the banking industry.

1.11 Justification for the study

The expanding dependence on digital banking has heightened financial organizations' vulnerability to cyber threats, leading to monetary damages, compromised client information, and reputational deterioration.. Banks continue to experience changing cyberattacks like ransomware, phishing, and insider fraud in spite of security frameworks in place, exposing weaknesses in current cybersecurity protocols.

This research is important since it will

●Find Security Gaps: This study will identify weaknesses that banks must fix by examining current cybersecurity measures.

●Boost Financial Security - Increasing banking cybersecurity will lower financial losses from cybercrime and boost confidence in online transactions.

●Support Regulatory Compliance: The study will shed light on how banks can better conform to industry best practices and changing laws, including NIST standards, GDPR, and PCI-DSS.

●Boost Customer Awareness: Having a better understanding of cyberthreats will aid in creating awareness campaigns that shield consumers from deception.

1.12 Research hypothesis

H1: Financial losses in banks are significantly impacted by cybercrime incidents.

H2: Banks are vulnerable to cyber assaults because their current cybersecurity procedures are inadequate.

H3 : The rise in internet penetration in India has led to an increase in cybercrime incidents.

1.13 Research Objectives

This research primarily aims to analyse cybercrime's impact on financial institutions and propose actionable measures to mitigate digital security risks. The particular goals are:

i) to identify which cyber threats - including ransomware attacks, phishing schemes, identity theft cases, and internal fraud - most significantly affect financial institutions.

ii) to evaluate the efficacy of the cybersecurity safeguards that banks have put in place to safeguard client information and financial assets.

iii) to assess how cybercrime affects monetary losses, banking institution consumer trust, and operational effectiveness.

iv) to evaluate how compliance standards and regulatory frameworks (such as GDPR, PCI-DSS, and NIST) help to reduce cyber threats in the banking industry.

v) to investigate cutting-edge cybersecurity tactics and technology including blockchain, artificial intelligence, and zero-trust architecture in order to stop cybercrime.

1.14 Research questions

1. What cybersecurity threats have impacted the banking sector?
2. What are the main legal mechanisms available to cope up with the issues?
3. What are the specific judicial notions dealing with such issues?
4. What steps should be taken to improve the position?
5. What are the loopholes in the Indian legal system which is affecting the customer's rights in combating cybercrime?

1.15 Research Methodology: Doctrinal Methodology

The doctrinal approach, often termed the "black letter" method, represents the conventional form of legal investigation. This research technique focuses primarily on legislation, judicial precedents, and similar authoritative legal materials. Unlike alternative methodologies, the purely doctrinal perspective treats law as a codified system of principles that can be examined exclusively through legal texts, without evaluating the law's practical effects or implementation. Employing doctrinal research methodology, this study rigorously evaluates judicial precedents, statutory provisions, and jurisprudential principles concerning cyber offenses in financial institutions. The research focuses on examining existing legislation, regulations, and judicial decisions to identify gaps and propose improvements in legal approaches to combat cyber threats in banking.

Primary Sources:

●International and national banking laws (such as the Cybersecurity Act, GDPR, PCI-DSS, and NIST).
●rules about banking and cybercrime (such as the Financial Services Regulations, the Computer Misuse Act, and anti-money laundering laws).
●Court rulings and case law of cybercrime in banking**.**

Secondary Sources:

●Books, research papers, and journal articles about financial regulations and cybersecurity laws.
●reports from oversight organisations such cybersecurity agencies, financial institutions, and

central banks.

●Whitepapers and government publications about cybersecurity rules and threats in banking.

1.16 Limitation of the research

●Statutes, case law, academic publications, and legal documents serve as the foundation for this research. It might not include firsthand accounts from banking professionals, cybersecurity specialists, or victims of cybercrime because it does not entail the collecting of actual data.

●Laws pertaining to cybercrime range from one nation to another, and legal frameworks might not be generally applicable. The study's generalisability to other areas with distinct regulatory regimes may be limited by its concentration on certain jurisdictions.

●Since cyberthreats are always changing, legal frameworks may find it difficult to keep up with more complex cyberattacks. The most recent changes to cybersecurity rules and regulations might not be covered by this study.

1.17 Chapterisation:-

Chapter 1: Introduction

The opening chapter provides a concise overview of cybercrime, e-banking, and the connection between cybercrime and the banking industry, along with various classifications of cybercrime. It includes a literature review referencing the BNS and DPDP Act 2023, while also outlining the research objectives, questions, and methodological approach. Additionally, this section justifies the study's relevance and identifies the existing research gap**.**

Chapter 2: An analysis of Cybercrime in the banking sector in the International scenario.

This chapter examines the global landscape of cyber threats targeting the banking sector, analyzing key trends, major attacks, and international responses. As digital banking expands worldwide, cybercriminals exploit vulnerabilities across borders, necessitating coordinated security measures and regulatory frameworks. The second chapter discusses international treaties, conventions, and cyber laws in various countries, including BRICS and OECD members. It highlights key perspectives from different nations to provide an understanding of cybercrime's impact on the banking sector.

Chapter 3: Analysis of Cybercrime in the banking sector and its legal provisions in India.

This chapter examines the growing threat of cybercrime in India's banking sector and analyzes the legal framework designed to combat financial cybercrimes. With the rapid digitization of banking services, cyber threats such as phishing, malware attacks, and UPI fraud have increased, necessitating robust cybersecurity laws and enforcement mechanisms. The third chapter examines the legal framework in India, including the IT Act 2000, BNS 2023, and DPDP Act 2023, while focusing on cybercrime's implications for the banking sector. It mentions the significant changes that are brought in the legal system regarding provisions of cybercrime. While India has a strong legal framework to combat banking cybercrimes, enforcement and technological adaptation need improvement. Strengthening cybersecurity laws, increasing awareness, and enhancing inter-agency coordination are crucial for safeguarding the banking sector.

Chapter 4: Judicial notions and legal mechanisms regarding cybercrime in the banking sector.

This chapter discusses relevant case laws pertaining to cybercrime in banking and outlines cybersecurity initiatives implemented by the RBI. It also explains the ombudsman's function in addressing cybercrime-related issues. Special attention is given to India's legal landscape, covering recent judicial trends under the IT Act 2000, RBI guidelines, and Supreme Court rulings on data privacy in banking. The analysis reveals gaps in current systems, including jurisdictional challenges in cross-border cybercrimes and difficulties in tracing digital assets. The chapter concludes by proposing judicial reforms needed for the digital banking era, emphasizing the need for specialized cyber judges, harmonized international laws, and faster dispute resolution mechanisms to keep pace with increasingly sophisticated financial cybercrimes.

Chapter 5: Conclusion and suggestions.

This chapter presents concluding observations and recommendations for preventing cybercrime within the banking sector. To fortify the banking sector, a multi-pronged approach is essential: strengthening cybersecurity infrastructure through AI and blockchain adoption; enhancing international cooperation for real-time threat intelligence sharing; simplifying legal processes with specialized cyber courts and faster dispute resolution; and prioritizing customer awareness to combat social engineering. Policymakers must focus

on updating laws to cover emerging technologies, mandating stricter compliance for fintech partnerships, and incentivizing cybersecurity investments. Ultimately, safeguarding digital banking requires continuous innovation in both technology and governance, with collaboration among banks, regulators, and customers as the cornerstone of a resilient financial ecosystem.

1.18 Conclusions

This study provides an overview of cybercrime's impact on the banking sector while examining relevant case laws. The Indian Financial System primarily contains a banking system as a core of its financial structure. There is a need to curb cybercrime by the government of India, making sure that wherever a person is involved in any type of banking transaction through the electronic mode, that person shall not be a loser financially. There is currently an increase in the rate of cybercrime and the process of investigation implies certain procedures. The rapid digitization of banking services has undeniably transformed financial transactions, offering unparalleled convenience while simultaneously exposing the sector to escalating cyber threats. This study has systematically examined the multifaceted challenges of cybercrime in banking, from emerging attack vectors like phishing, ransomware, and UPI fraud to jurisdictional complexities in prosecuting cross-border financial crimes. Analysis of global and Indian legal frameworks reveals that while robust regulations exist—including the IT Act 2000, RBI guidelines, and international conventions like GDPR—gaps persist in enforcement, victim redressal, and adaptation to evolving threats like AI-driven attacks and quantum computing risks. Judicial mechanisms, though progressively addressing digital evidence and liability, often lag behind the sophistication of cybercriminals.

Chapter 2: An analysis of Cybercrime in the banking sector in the international scenario.

2.1 Introduction:

The banking industry remains at the forefront of cybersecurity development due to its traditionally cautious risk management approach, consistent heavy investments in security infrastructure, and long-standing collaborative efforts at both institutional and regulatory levels. As a result, financial institutions continue allocating significant resources to combat the evolving, sophisticated cyber threats from global organized crime networks. Simultaneously, banks across the US, Europe and Asia encounter growing challenges in complying with an expanding web of national, regional and local cybersecurity regulations that often impose burdensome requirements. The accelerated adoption of emerging digital technologies including blockchain, cloud services and IoT has simultaneously introduced new security gaps in both consumer and enterprise systems that malicious actors increasingly exploit. Current estimates place worldwide cybercrime losses exceeding $7 trillion USD, with projections indicating steep escalation in coming years. Global IoT malware infections recently surpassed 100 million incidents, while the Asia-Pacific region has emerged as a prime target for cybercriminals due to its rapid digital transformation and widespread adoption of cutting-edge technologies. The international nature of these crimes presents unique complexities, as perpetrators often operate from jurisdictions with weak cyber laws, while targeting banks in financially advanced nations. Organized cybercrime syndicates leverage advanced tools like artificial intelligence, cryptocurrency networks, and zero-day exploits to bypass security measures. Meanwhile, state-sponsored actors engage in financial espionage and disruptive attacks that blur the lines between cybercrime and cyber warfare. Despite efforts like the Budapest Convention and INTERPOL's global task forces, disparities in legal frameworks, reporting mechanisms, and enforcement capabilities hinder coordinated responses. As banks increasingly adopt cloud computing, open banking APIs, and IoT-based services, the attack surface continues to expand. This necessitates not only stronger technological defenses but also harmonized international regulations, real-time intelligence sharing, and public-private partnerships. Understanding the global dimensions of banking cybercrime is critical for developing proactive strategies that safeguard financial systems while balancing innovation with security in an increasingly borderless digital economy.

2.2 Recent Cybersecurity Incidents involving Bank of America:

Between December 2023 and February 2024, Infosys McCamish Systems (IMS), a third-party provider handling Bank of America's deferred compensation plans, suffered a major cybersecurity breach. The incident resulted in unauthorized access to personal data of roughly 57,000 Bank of America customers, including names, addresses, Social Security numbers, and financial account information. The LockBit ransomware gang publicly admitted to attacking IMS. In response, Bank of America is offering affected individuals two years of complimentary identity monitoring services. In a separate incident reported in April 2025, Bank of America disclosed another data compromise involving sensitive customer records related to savings bonds that were intercepted during transmission. These documents contained personally identifiable information such as full names, physical addresses, contact numbers, Social Security identifiers, and bank account details. Ongoing complex frauds (April 2025): Bank of America issued an urgent warning about increasingly complex cyber frauds aimed against its clients. These scams entail contacting individuals via various channels (emails, SMS, calls) claiming critical concerns with their accounts and pushing them to click harmful links or attachments that install malware, allowing hackers to control their devices.

2.3 INTERNATIONAL CYBER LAWS:-

1. **UK cyber law:-**

   The UK banking sector's cybersecurity framework operates under a comprehensive regulatory structure safeguarding financial system integrity, customer information, and operational continuity. Below are the key legislative instruments and regulatory provisions:

   The UK General Data Protection Regulation (GDPR) and Data Protection Act 2018 constitute the foundation of data protection laws in the UK, setting standards for processing and securing personal information. Core provisions require that data processing must be lawful, fair, and transparent, with information collected only for specific, justified purposes. This regulatory framework is also known by other names, including the Clinger-Cohen Act.

   The UK maintains its position at the forefront of cybercrime regulation, having introduced the groundbreaking Computer Misuse Act 1990. However, with rapid technological evolution and new forms of digital offenses, the UK Parliament implemented revised cybercrime laws that came into force on 7th November 2006.

This revision specifically targets Denial of Service (DoS) attacks, prescribing maximum 10-year sentences - addressing a gap in the original Act which only penalized unauthorized data modification without recognizing DoS as distinct cybercrime. The updated legislation defines DoS attacks as overwhelming servers with excessive data traffic until failure occurs.

The Information and Computer Technology Act 2006 specifies these offences as punishable by up to 10 years imprisonment:

- Unauthorized computer access
- Data or program corruption/obstruction
- Program deletion. Additionally, conspiring to commit these offences carries a maximum 2-year sentence.

Here is an overview of key cybersecurity laws and regulations essential for safeguarding the UK's digital ecosystem and critical infrastructure:

- **Data Protection Act (DPA) 2018**
- **UK General Data Protection Regulation (UK-GDPR)**
- **Network and Information Security Directive (NIS 2)**
- **Digital Operations Resilience Act (DORA)**
- **UK Operational Resilience Framework**
- **EU Cybersecurity Act**
- **EU Cyber Resilience Act**
- **Computer Misuse Act 1990**
- **EU Artificial Intelligence Act**
- **Telecommunications (Security) Act 2021**
- **Privacy and Electronic Communications Regulations (PCER)**

Numerous UK enterprises additionally comply with international cybersecurity standards like PCI-DSS, NIST, SOX, and HIPAA, though these are not legally mandated under UK jurisdiction.

2. **Republic of India's cyber laws:** In 2003, the Indian Government made a public announcement about its intention to formulate a solid law to tackle the increasing acts of cyber-crimes. 66. Applying computer systems for hacking. Hacking constitutes deliberate and wilful actions causing unlawful damage or injury to individuals or the

public, where a person intentionally obtains unauthorized access to computer systems through any method with the purpose of maliciously changing or corrupting stored data.

3. **China's People's Republic of Cyberspace Law** [11]Chinese internet crime legislation primarily addresses key concerns through components of the People's Republic of China's civil and criminal laws. The Public Security Bureau handles internal security while the Ministry of State Security manages external security. Computer information network and internet security regulations, jointly issued by the State Council, became effective on December 11, 1997, and December 30, 1997, respectively, formally establishing the Public Security Bureau's (PSB) responsibilities in this domain. In November, a ransomware attack on the Industrial and Commercial Bank of China (ICBC) - China's largest financial institution and the world's biggest bank by assets - disrupted global markets. The cyberattack targeted ICBC's US subsidiary, briefly interrupting US Treasury market activities and blocking client transactions. Although ultimately controlled, this incident raised serious concerns about vulnerabilities in major financial organizations, highlighting the critical necessity for strengthened global cybersecurity measures.[12]

4. **United States of America cyber law**

   The National Security and Homeland Security Advisors have been tasked by President Barack Obama with reviewing the government's cyber security plan, initiatives, and initiatives, including the implementation of new laws to fight cybercrime. On February 7, 2010, US Vice President Joe Biden spoke at the 45th Munich Conference on Security Policy. He stressed the importance of addressing terrorism and cyber-security among other things.

The Federal Criminal Code (USA)

The U.S. Federal Criminal Code addresses cybercrimes through three primary approaches:

a.Theft and associated actions concerning access devices

b.Computer-related fraud and related activities

c. The system, stations, and communication lines

[11] https://www.lawyersnjurists.com/article/international-perspective-on-cyber-crime/

[12] https://gfmag.com/banking/icbc-industrial-and-commercial-bank-of-china-ransomware/

The 1980 U.S. Privacy Protection Act

The United States Privacy Protection Act of 1980 safeguards an individual's privacy rights concerning data stored on computers and other electronic devices under their possession, such as laptops, floppy disks, and diskettes. Law enforcement officers may access and search electronic records only after obtaining a proper court-issued search warrant and demonstrating probable cause that the information contains evidence of criminal activity. Consequently, computer-related searches remain constitutional provided they do not infringe upon an individual's right to privacy.

The U.S. Computer Security Act of 1987 was enacted by Congress to require federal agencies to improve protection measures for government computer systems. This legislation tasked the National Institute of Standards and Technology (NIST) with developing security standards for federal information technology infrastructure.

5. CANADA:-

Key Features of Cybercrime in Canadian Banks:

●Rising Threat: The Office of the Superintendent of Financial Institutions (OSFI) has recognised cybercrime and artificial intelligence as major threats to Canadian banks, with "high impact" cyber attacks nearly tripling between 2022 and 2023.

●Customer Concerns: The vast majority of Canadians are concerned about online banking cybercrime and possible data breaches at their financial institutions. Many people would consider switching banks if a data breach occurred.

●Cost of Breaches: Data breaches in the Canadian financial services sector are among the most expensive in the world, with an average cost of more than $9 million.

●**Common Cyberattack Techniques:** Malicious actors employ multiple approaches, such as:

Phishing, Vishing, and Smishing - deceptive practices using fraudulent emails, voice calls, or SMS messages to extract sensitive data. Canada's Criminal Code categorizes unauthorized computer access as illegal under Section 342, while unlawful communication interception is prohibited by Section 184. Having ratified the European Convention on Cybercrime, Canada implemented the Council of Europe's cybercrime framework on November 23, 2001. This international treaty defines five principal cybercrime categories: security/privacy violations, unauthorized system intrusion, intellectual property theft, confidentiality compromises, and online fraud operations.

AUSTRALIA While Australia lacks a single, consolidated "cyber law" for banks, a strong structure of legislation and regulations governs cybersecurity in the financial sector. These rules are intended to secure client data, safeguard the financial system's stability, and hold businesses accountable for security procedures. Here's a breakdown of the important pieces of legislation and regulatory guidelines related to cyber laws in Australian banks:

1. Privacy Act of 1988 and the Australian Privacy Principles (APPs)
2. The Security of Critical Infrastructure Act 2018 (SOCI Act) and its amendments:
3. APRA Regulations and Guidance:
4. The Australian Securities and Investments Commission (ASIC) Act 2001

The essence of cybercrime legislation has only recently been introduced in Australia as compared to other countries, with different strategies being implemented by different State and Federal governments. Concerning the problem of cybercrime, both the Federal and State Governments in Australia introduced several offences by passing the laws. A fresh Act named the “Cyber Crime Act, 2001” was introduced in the Australian legal framework and the provisions under this Act came into force on 2002-04-02, which has amended the laws concerning computer offenses. The Act establishes the following three serious computer offences:

1. Unapproved entry: The maximum penalty for the more grievous crime committed is suffered when modifying or impairing with the aim of perpetrating the crime. For example, if an individual unlawfully accesses a bank's computer system to obtain credit card information for fraudulent financial gain, they will face arrest, prosecution, conviction, and appropriate penalties for their attempted fraudulent activities. Unauthorised data alteration a person is not specific if the modification they are going to make will encompass data, then they can be imprisoned for up to a decade at most. It is for this purpose incorporated to solve several situations, such as: In a computer system, when an unauthorized invader gets unauthorized access to a computer and maliciously alters data.
2. Privacy violations related to respect and contemplation for the user’s private electronic correspondence
3. The offense carries a potential enhanced penalty of 10 years' imprisonment, designed to deter activities like Denial of Service (DoS) attacks - where systems are flooded with excessive traffic causing server failure. The legislation establishes four additional computer-related offenses: (1) Illegal access to or modification of protected data, punishable by up to two years imprisonment; (2) Unlawful deletion

of computer-stored information, also carrying a two-year maximum sentence; (3) Possessing data with intent to commit cybercrimes, subject to three years imprisonment; and (4) Creating, distributing, or obtaining data for criminal purposes, with a three-year maximum penalty under the Act. Australia employs a comprehensive strategy against banking sector cybercrime, combining legal measures with regulatory oversight.: Commonwealth legislation: The Cybercrime Act of 2001 establishes federal criminal charges for computer-related crimes. The Proceeds of Crime Act of 2002 allows for the forfeiture of assets acquired via cybercrime. The Privacy Act of 1988 governs how organisations, including banks, handle personal information, and it contains required data breach notification procedures.State and Territory Legislation: Each state and territory has its own laws governing computer crimes and fraud. The Australian Prudential Regulation Authority (APRA) sets prudential rules for banks, including operational risk and cybersecurity. APRA expects banks to have strong frameworks for managing cyber risks and ensuring operational resilience.

5. JAPAN

Japan is among the nations that have ratified the European Convention on Contracts. on Cybercrime created to stop cybercrimes. Two laws in Japan address protecting people from cybercrimes: the act of 2000 on unauthorised computer access this particular act's objectives include the prohibition of acts involving unauthorised computer access, eradicating computer related crimes that are carried out through a telecommunication line, ensuring proper transmission which is accomplished through access control functions, and the promotion of a healthy growth of the information and telecommunications society of the future. Also, it sets a few rules defining concepts associated with the act. codic Terminal also provides several other sections that categorize the activities related to unauthorised computer access as crimes, which in turn are under penal rules. The 1999 Computer Crime Act amends the Japanese penal code and, apart from it, also introduces a new one to fit the problem of cybercrime. many of the provisions were changed by this act to fit the new issues occasioned by cybercrimes. measures that are being taken internationally to mitigate against cyber crimes.

Increased Cyber Incidents: Japan has seen an increase in cybercrime cases, notably those targeting the financial sector. In 2019, online banking fraud increased significantly and resulted in losses exceeding ¥2.5 billion. Ransomware assaults: Japanese organisations, notably those in the financial sector, have experienced an increase in sophisticated ransomware assaults, causing disruptions. Phishing and malware remain popular tactics for thieves to acquire

banking passwords and personal information. Phishing attacks frequently imitate banks, tricking users into disclosing valuable information or installing malware. Business Email Compromise (BEC): While specific bank data is not always isolated, BEC assaults against Japanese organisations can have an impact on financial activities and bank connections.

6. **BRAZIL**[13]Brazilian public institutions, banks, and citizens face significant threats from cybercriminal organizations. In October 2016, shortly after the Olympic Games concluded, attackers compromised and altered the DNS records for all 36 web domains belonging to Brazilian financial institution Banrisul. The perpetrators redirected both computer and smartphone users to fraudulent websites and allegedly intercepted ATM transaction details, potentially obtaining victims' payment card data. During the May 2017 worldwide 'WannaCry' ransomware outbreak, affected Brazilian entities included the national social security administration, telecommunications company Vivo's main offices, São Paulo's public prosecutor department, and state-owned energy firm Petrobras.
7. **RUSSIA**: In 2024, Russia's central bank documented more than 750 cyberattack incidents targeting financial organizations. Most attacks aimed to disrupt corporate information systems or make services inaccessible (distributed denial-of-service attacks). Cybercriminals have also intensified efforts to compromise financial service providers' vendors as a pathway to infiltrate institutional networks.
8. **FRANCE**: The Bank of France was subjected to a distributed denial-of-service (DDoS) attack, purportedly carried out by the hacktivist organisation Anonymous as part of Operation OpIcarus. The hack crippled the bank's website, making it unreachable for many hours. Anonymous claimed responsibility and stated that the attack aimed to show solidarity with the #NuitDebout demonstrators and defend the concept of freedom, matching their online efforts with the ongoing street protests.
9. **INDONESIA**: Types of Cybercrime Against Banks in Indonesia: Online Banking Fraud: This includes a variety of methods for stealing login credentials and conducting unauthorised transactions. Phishing/Smishing: Deceptive emails/texts posing as banks to extract sensitive data. Ransomware: Malicious software that locks banking systems or client files, demanding payment for restoration - exemplified by Bank Syariah

[13] https://igarape.org.br/brazil-struggles-with-effective-cyber-crime-response/(10/2024)

Indonesia's May 2023 attack causing operational disruptions. BEC: Fraudsters pose as company officials to authorize fraudulent transfers. Data Theft: Cyber intrusions into bank networks leading to unauthorized access of personal records, as occurred in Bank Syariah Indonesia's 2023 breach exposing customer/staff details. Social Engineering: Psychological manipulation to obtain confidential data or prompt security-compromising actions. Malware Infections: Hostile programs designed to extract information or impair operations. ATM Skimming: Illegal devices capturing card data at cash machines: Although less commonly mentioned in recent headlines for Indonesia, it remains a possible hazard. Scammers create bogus mobile banking apps to steal credentials and financial information. Cyber espionage refers to advanced persistent threats (APTs) that target financial institutions for strategic benefit. Deepfake Technology: An emerging threat in which artificial intelligence is utilised to generate fake photographs and audio in order to trick biometric verification processes.

Impact of cybercrime on Indonesian banks:

Financial Losses: Fraudulent transactions and theft cause huge financial losses for banks and their clients.Reputational Damage: Cyberattacks can undermine client trust and harm the bank's image. Operational Disruptions: Attacks such as ransomware can paralyse banking systems, preventing clients from using services. The BSI ransomware outbreak in 2023 disrupted service for several days. Data Exposure: Compromised personal and financial information can lead to identity theft and other criminal acts. Customer Confidence: Frequent cyber events might erode public trust in digital banking security. Increased Operational Costs: Banks must invest extensively in cybersecurity protection and incident response, which increases their operational costs. Legal and regulatory sanctions: Failure to protect customer data may result in fines and other penalties from regulatory organisations.

Attempts to combat cybercrime:

Increased Regulatory Scrutiny: The OJK and BSSN are striving to improve cybersecurity regulations and enforcement in the financial sector. Banks Invest in Advanced Security Technologies, Multi-Factor Authentication, Transaction Monitoring, and Customer Awareness Programs. Collaboration and Information Sharing: Banks, regulatory authorities, and law enforcement agencies are increasingly working together to exchange threat intelligence and coordinate cyber incident responses.Public Awareness efforts: Banks and government organisations are running efforts to educate the public about cyber hazards and how to avoid them. Establishment

of Cyber Incident Response Teams (CIRTs): Regulations now require financial institutions to form and register CIRTs to monitor and respond to cyber incidents effectively.

10. **TURKEY**: Cybercrime offers a substantial and evolving threat to Turkish banks, reflecting global trends. Here's an overview of the important features:Types of Cybercrime Against Banks in Turkey:Phishing attacks are common, with attackers mimicking large Turkish banks via emails including malicious attachments (.EXE,.JAR) aimed to install malware and gain control over infected PCs. These emails frequently provide consumers with bogus debt letters or credit card statements. Malware and Backdoors: Sophisticated malware, such as the Java-written backdoor "JRat," is used to acquire unauthorised remote access to compromised machines within bank systems or owned by customers. This enables attackers to steal data, install more malware, or utilise hacked PCs for malevolent purposes.Distributed Denial of Service (DDoS) Attacks: While the offered sources do not place a strong emphasis on DDoS against Turkish banks, they are a regular danger to online services around the world and could be used to disrupt banking operations.
    Online fraud involves a variety of approaches, including unauthorised access to information systems in order to steal data or influence transactions.Misuse of bank and credit cards involves unauthorised usage, counterfeiting, and obtaining cards through illegal means.
    Cyber Laws & Regulations in Turkey:
    Turkey has a legal framework in place to prevent cybercrime, which includes laws applicable to the banking sector:
    - Article 243 of Turkish Penal Code No. 5237 addresses cybercrime, namely illegal access to computer networks.
    - Preventing a system's operation and data deletion, alteration, or corruption (Article 244).
    - Misuse of bank or credit card (Article 245).
    - Making, selling, buying, or accepting Prohibited Devices and Programs (Article 245/A).
    - Computer and Communications Fraud (Article 158/1-f).
    - Larceny Committed with the Use of Data Processing Systems (Article 142/2.e).

    Attempts to combat cybercrime:

Specialised Law Enforcement Units: The National Cybercrime Department of the TurkishNational Police (TNP) and specialised cybercrime bureaus within Chief Public Prosecutors' Offices investigate cybercrime. National Cybersecurity Strategy: Turkey has created national cybersecurity strategies to strengthen its defence capabilities. The USOM (National Cyber Incident Response Centre) monitors cyber security incidents, issues alerts, and coordinates responses. Information Sharing: Banks, the Turkish National Police, and the Turkish Computer Emergency Response Unit (TR-CERT) meet on a regular basis, while information sharing between banks has previously been found to be minimal.

11. **NETHERLANDS:-** Cybercrime in Dutch banks is becoming a major worry for financial institutions, consumers, and the Dutch government. Cybercriminals target not only individual consumers to obtain access to their bank accounts via phishing and malware, but also banks to steal significant sums of money, customer data, or disrupt operations via ransomware and DDoS assaults.

    Key trends and information: Rising Cybercrime: While traditional crimes such as burglary are down, cybercrime is increasing in the Netherlands, affecting a growing number of people. Cybercriminals want to steal money and sensitive customer data from banks. Attacks try to disrupt the functioning of financial institutions, potentially affecting the payment system. Dutch Central Bank Warning: In early 2025, the Dutch Central Bank (De Nederlandsche Bank - DNB) issued a warning about the growing threat of DDoS assaults, recommending residents to carry some cash at home as a backup plan for any disruptions to digital payment systems. The frequency and sophistication of cyberattacks on financial institutions have reportedly increased by 50% since 2023. De Nederlandsche Bank (DNB) regulates financial organisations' ICT risk management, including information security and cybersecurity. They also use "TIBER" tests to evaluate the cyber resilience of critical financial infrastructure.

    The DNB and other organisations advise people to:

    - Never share login information with anybody.
    - Install the most recent security updates for banking software.
    - Check your bank accounts regularly for any unauthorised activity.
    - Report incidents to the bank right away.
    - Be wary of strange links and requests for personal information.

●Use strong, unique passwords, and activate two-factor authentication wherever possible.

●Finally, cybercrime poses a substantial and evolving threat to banks in the Netherlands.

To reduce these risks, a multifaceted approach that includes robust security measures implemented by financial institutions, strong legal and regulatory frameworks, government activities, and enhanced public awareness is required.

12. **PORTUGAL:** Cybercrime at Portugal's banks is a developing concern, in line with global trends. Cybercriminals use increasingly sophisticated tactics to target both financial institutions and their clients.

Key trends and information:

●Phishing Attacks: This is a common tactic, with fraudsters mimicking Portuguese banks (such as Caixa Geral de Depósitos, Novo Banco, and Montepio Geral) by email and SMS. These frequently drive users to fraudulent websites that steal login passwords and personal information.

●Malware: Malicious software, including banking trojans like QakBot, is used to steal banking passwords and other sensitive data.

●Data Breaches: While specific large-scale data breaches in Portuguese banks haven't received as much attention as in other nations, the threat of data exfiltration remains a concern.

●Ransomware: This sort of attack, in which systems are held hostage for ransom, poses a substantial danger to numerous sectors in Portugal, particularly the banking industry, as it has in other European countries.

●Business Email Compromise (BEC): Targeting businesses to induce fraudulent payments is a well-known practice around the world, and it is likely that it also applies to Portugal.

●DDoS Attacks: The Portuguese Central Bank (Banco de Portugal), part of the European Central Bank system, has issued a warning about the growing threat of DDoS attacks on financial institutions. Regulatory Landscape and Measurements:

●Banco de Portugal: As the central bank and financial supervisor, Banco de Portugal has regulations governing ICT risk management and cybersecurity in the financial industry. They also engage in the Banking Industry Forum on Cybersecurity and Operational Resilience (FICRO), which helps to coordinate efforts and share best practices.

●As an EU member, Portugal is subject to the Digital Operational Resilience Act (DORA), which aims to improve the digital operational resilience of financial institutions. The European Commission has formally cautioned Portugal for failing to completely transcribe DORA into national legislation by the January 17, 2025 deadline, and it has two months to reply. Full deployment is likely to improve cybersecurity needs.

●Personal Data Protection Act: Portugal follows the EU's General Data Protection Regulation (GDPR), which requires banks to implement strong security measures for personal data and to notify customers of data breaches.

●The National Cyber Security Centre (CNCS) in Portugal strives to improve the country's cybersecurity posture, provide guidance, and increase awareness about online fraud aimed at banking consumers. They also discuss best practices for online banking security.

●Cybercrime Law (Law 109/2009): Portugal has particular cybercrime legislation that covers offences such as illicit access, data damage, fraud, and phishing.

●Investment in Cybersecurity: Recognising the growing threats, organisations in Portugal, notably financial institutions, have increased their investment in cybersecurity solutions.

Finally, cybercrime presents a big challenge for Portuguese banks. The government is attempting to tighten its legal and regulatory framework, and financial institutions are investing in security measures. Customers must remain vigilant and attentive in order to prevent successful intrusions.

13. SWEDEN:

Sweden, a highly digitised nation that relies heavily on online banking and digital payment systems such as BankID, is facing a huge and expanding cybercrime scenario aimed at its financial industry.

Key trends and information:

● Increased Digital Fraud: As Sweden transitions to a cashless society, online fraud and digital crime have grown. Criminals reportedly stole 1.2 billion kronor through scams in 2023, more than tripling the amount taken in 2021.

●BankID Exploitation: BankID, a popular digital identity system, has become a target for clever fraudsters who deploy plausible scams to deceive customers into confirming illegal transactions.

●Malware and Phishing: Traditional methods like as phishing emails with malicious attachments (e.g., the JRat backdoor) are still used to gain access to computers and steal passwords.

●DDoS Attacks: In April 2025, the Swedish Bank-ID service was subjected to a Distributed Denial of Service (DDoS) assault, which disrupted service but did not compromise user data. This demonstrates the vulnerability of crucial digital infrastructure.

●Ransomware: While Sweden's defences against ransomware are apparently improving, the danger remains serious, with attacks getting more severe and targeting vital weaknesses.

●Business Email Compromise (BEC): This sort of fraud, which attempts to trick firms into making unauthorised payments, is also an issue.

●Organised Crime Involvement: Organised crime and gang activities account for a major share of fraud offences in Sweden, with sophisticated methods used to exploit the welfare system.

●Exploitation of Technical Vulnerabilities and AI: Cybercriminals are becoming increasingly adept at exploiting technical flaws and are beginning to use AI to commit fraud against both customers and bank employees.

Regulatory Landscape and Measurements:

The Swedish Criminal Code states that hacking is a criminal offence punishable by fines or imprisonment, with more severe consequences for serious offences. Act on Information Security for Critical and Digital Services: Enacted the EU's NIS regulation to improve the security of network and information systems for critical services, particularly finance.The Cybersecurity Act (EU) aims to strengthen cybersecurity across the EU by allowing for recognised certifications.The Digital Operational Resilience Act (DORA): As an EU member, Sweden is subject to DORA, which aims to improve the digital operational resilience of the financial sector.Established in 2020, the National Cybersecurity Centre (NCSC) aims to strengthen national coordination and response to cybersecurity threats.

14. **OECD**: The primary themes and types of cyber laws and regulations popular in OECD nations regarding banks:

1. **Data Protection and Privacy Regulations:** Financial institutions operating in OECD member countries are obligated to follow extensive data governance and privacy requirements when managing customer information. These regulations commonly include core provisions such as:

   Legal processing mandate: Information must be handled in accordance with legal standards, ensuring fairness and transparency.
2. **Specific usage requirements:** Collection and utilization of data must be restricted to clearly defined, lawful objectives.
3. **Minimal data requirements:** Institutions should only acquire and store the absolutely necessary personal information.
4. **Accuracy obligations:** Maintained data must be kept correct and current.
5. **Time-bound retention:** Personal information should not be stored beyond required periods.
6. **Security protocols:** Implementation of protective measures to prevent unauthorized disclosure, destruction, or alteration of sensitive data.
7. **Financial sector-specific regulations**: Many OECD nations have financial regulators (e.g., banking supervisors, securities commissions) who set cybersecurity rules and guidelines for banks and other financial firms. These restrictions frequently focus on:Operational Resilience: Banks must have frameworks in place to ensure they can continue to function and provide vital services during and after cyber catastrophes. This encompasses business continuity and disaster recovery planning. Risk Management: Banks must build and maintain comprehensive information security risk management procedures to detect, assess, and mitigate cyber risks.Governance and Oversight: Establishing requirements for boards and top management to monitor and account for cybersecurity.
8. **Critical Infrastructure Protection Laws:** Recognising the financial sector's systemic importance, certain OECD countries have included banks in their critical infrastructure protection regulations. These regulations frequently impose special security duties on designated critical infrastructure firms to ensure their resilience to a variety of threats, including cyberattacks.Examples include Australia's Security of Critical Infrastructure Act and comparable legislation in other OECD nations that recognises the financial sector as critical.
9. OECD countries have legislation in place to address cybercrime, including targeting banks and customers. These laws typically address offences like unauthorised

access to computer systems.Data theft and fraud. Malware dissemination. Phishing and identity theft. These rules establish a legal basis for pursuing cybercriminals who target the financial sector.

2.4 International treaties:-

1. The international droit conference of Germany held in 1992

The collegiums on "computer crime and other crimes against information technology" were held by association internationale droit ponel (adip) in wartzburg, germany. the report indicates that based on its sample, police were only receiving 5% of the cyber crimes reports. this report identified the following as contributory causes to the non-disclosure of cybercrimes:here, it is extremely difficult to pinpoint unlawful actions because the computer hardware and nesting chain operate rapidly and store vast amounts of information.

(ii)The current employees within the law enforcement agencies lack the technological know-how to combat cybercrime (iii). For this reason, such victims never report the crime to the police since they feel that they will be constantly harassed and that reporting the crime will not be productive.

(iv). The victim is also made to avoid reporting the incident, fearing social backlash (v). Other reasons why cybercrimes are not reported include: embarrassment of the incident, loss of confidence from investors/shareholders, company goodwill and public confidence, among others.

2.G-7 summit in cybercrime, the twenty-second (1996).

During the G-7 counterterrorism conference in León, France (July 1996), member nations committed to accelerating discussions and collaboration through appropriate bilateral and multilateral meetings regarding encryption technologies. These measures would permit, under specific circumstances, lawful government access to digital communications and data to combat cyberterrorism and associated crimes while safeguarding legitimate users' rights. The summit particularly stressed the importance of securing information systems, protecting personal data, and preserving intellectual property rights.

3.G-8 working group on high-tech crime (1998).

A hi-tech crime sub-group of g-8 countries was formed in march 1998 to fight the menace of cyber-crime under the umbrella of international cooperation programme. some of its functions are to scrutinize the g-8 countries' legal systems, coordinate international forums, render cross-border retrieval of stored data, and aids in hi-tech crime investigations over internet proceeding of unlawful change to or distribution of data/evidence.thus, in an attempt to ease the exchange

of information on cybercrime, every g-8 country has an identified contact in their law enforcement agencies. members from consumer and industry organizations attended the g-8 subgroup conference held in paris france in 1998, to discuss on internet issues that affects consumer and industry establishments and to come up with measure that would offer protection to these via e-commerce.

5. **The cybercrime discussions held in the Paris conference held in the year 2000.** Around 300 attendees, primarily comprising judges, law enforcement officials, diplomats, legal experts, and business leaders from G-8 nations, participated in a May 2000 cybercrime symposium in Paris. The event emphasized the urgent need for worldwide legislation targeting hackers, software pirates, spammers, and malware creators whose online activities were severely disrupting digital lives. Participants unanimously recognized the necessity for an international treaty addressing cybercrime matters, particularly the establishment of a global criminal court with authority to apprehend and adjudicate cybercriminals worldwide. Consequently, delegates concluded that nations must maintain close collaboration and coordination in investigating and prosecuting these sophisticated offenses, regardless of territorial borders, due to the transnational nature of cybercriminal operations.

5. Internet treaty of the Council of Europe signed in January 2001

The Council of Europe has been dealing with the increasing tendency of danger connected with hacking and other computer crimes for decades, starting in the 1980s. all the member states of the council of europe have agreed on the fact that dealing with the problem of relative internet infrastructural insecurity any cooperation with other countries for fighting cybercrime has to be trusting, mutual and bilateral. The council of europe enumerates the following three (i). Challenges associated with technology that increases the difficulty of apprehending the internet cybercriminals by the police.(ii). It will be useful to change several legislative acts as substantive and some procedural legislation has not developed in consonance with the contemporary advances in technology. this paints lacunae of legal nature to the successful prosecution of cyber criminals.Finally, there is a need to upgrade physical facilities in order to enable the police organizations to cope with the advancement of technology in practice, especially with the view of increasing readiness of citizens to fight cybercrimes.

6. Budapest, November 2001, European Convention on Cybercrime bank

The Budapest Convention on Cybercrime, adopted on November 23, 2001, marked a

significant advancement in establishing harmonized global cyber legislation. This international treaty sought to confront the evolving challenges posed by digital transformation, technological convergence, and increasing globalization of computer systems and electronic data, along with the emerging threats these developments created for cybercrime proliferation.

Recognizing the critical necessity for global cooperation and a standardized legal framework to protect against digital offenses, the convention established a detailed treaty comprising 48 provisions across 4 distinct sections. The legal standards set forth in this European initiative have subsequently served as a foundational blueprint for numerous nations developing their own cybercrime laws and security protocols through various multinational platforms.

7. Fourth International Conference on Cybercrime, Cybersecurity, and Law 2004

Chandigarh, India hosted an international conference on e-security, cybercrime, and law on February 19–20, 2004. The following were the primary topics for discussion at the conference:

(i). Corporate governance, industrial incursions, and network providers' hacking responsibility all require careful consideration when it comes to network security.

(ii) It was necessary to improvise data and transmission standards as well as encryption techniques. During the meeting, topics such data banking security and electronic fund transfers were also covered.

(iii) Significant focus and realignment were required concerning computer forensic procedures, maintaining digital evidence integrity, and law enforcement methodologies for evidence collection.

(iv) Participants stressed the necessity for comprehensive legislation addressing cyber law and data security. Discussions encompassed diverse subjects such as legal frameworks for network protection, law enforcement in cyberspace, judicial functions in technology-related cases, and community involvement in cybercrime deterrence.

8. International Conference on Cybercrime, Kiev, 2004

From May 26-28, 2004, Zaporozhye State University in Ukraine hosted an international conference jointly organized by the Computer Crime Research Centre and the World Anti-Criminal and Anti-Terrorist Forum. The event's discussion topics encompassed cyberterrorism, cybercrime prevention, intellectual property infringements, digital piracy, and legal aspects of information security.

9. The Asia-Pacific Economic Cooperation (APEC) 2004.

APEC member nations held a summit committing to create an extensive legal structure for cybercrime prevention, control, and cybersecurity improvement in accordance with recognized

international legal standards. During their November 2004 ministerial meeting in Santiago, Chile, participating countries agreed to strengthen economic collaboration against cyber threats.

10. International Conference on Cybercrime, Brazil, 2006

The International Cyber Crime Conference, the third major global gathering on this subject, took place in Brasília from November 6-9, 2006, attracting hundreds of IT experts to examine computer-related offenses and their prevention strategies. Key discussion points included: transnational cybercrime, investigation methods and extradition procedures for digital offenders, modern cybercrime task force structures, critical infrastructure security initiatives, cybersecurity measures, underground hacking operations, illegal online file-sharing, and various forms of electronic and internet-based criminal activities.

11. Eleventh Congress on Offender Treatment and Crime Prevention (2005)

The 11th UN Crime Congress in Bangkok (April 18-25, 2005) brought together delegates to analyze worldwide cybercrime patterns and discuss key prevention strategies. Attendees concluded that existing domestic laws remained inadequate to curb the escalating transnational cybercrime threat, necessitating enhanced multilateral cooperation at bilateral, regional, and international levels to improve crime prevention and criminal justice responses.

12. Cybercrime: Seventh International Conference (2007)

The Seventh International Cyber Crime Conference was held at Delhi's Vigyan Bhawan on September 12, 2007, emphasizing the crucial need for enhanced cyber security awareness and effective preventive strategies against digital offenses. In his inaugural address, then Union Home Minister Shri Shivraj Patil observed that "while cybercrime emerged relatively late as a serious criminal category, it now encompasses an extensive range of unlawful activities."

The computer systems of crucial installations are vulnerable to major security breaches caused by hacking, spoofing, and botnet assaults. The potential risk posed by these attacks to the country's security is enormous. Money laundering for terrorist funding through online avenues has reached frightening dimensions on a global scale.

13. The Terrorism and Organised Crime International Conference (2008) took place on August 25, 2008, in Anaheim, California, addressing critical issues such as:

- Domestic and international terrorism
- Misuse of WMDs
- Organised crime networks
- Human trafficking and smuggling operations

- Identity fraud
- Internet-based narcotics trade
- International financial laundering operations
- Weaknesses in electronic commerce systems
- Digital fraudulent practices
- Computer forensic methodologies

The conference emphasized forensic science's growing importance in cybercrime investigations and the critical involvement of information technology specialists in law enforcement processes.

14. The Third International Conference addressing Information Technology Security and Privacy Concerns (2008) was convened in Prague, Czech Republic, on September 3, 2008. focusing primarily on information technology and preventing illegal activities stemming from technological progress. Participants unanimously acknowledged the urgent need to establish international legal frameworks to protect both individual privacy rights and national security interests, particularly for digital technology users.

15. Cybersecurity Conference Defence Techniques (2009)

A global conference addressing cybersecurity and defence strategies was conducted in Gatineau, Quebec, from November 2-3, 2009. Participants concluded that immediate action was required to enhance protective systems against escalating digital threats. Preceding this event, Washington, DC hosted a Cyber Crime Security Control System Conference from October 19-21, 2009, which examined collaborative solutions to cyber risks, analysed existing national security protocols, and emphasized expanding international cooperation. Additionally, Athens, Greece, welcomed attendees to The Emerging Security Information Systems and Techniques Conference (June 18-23, 2009) highlighted different countries' progress in developing intelligence security frameworks.

16. International Conference on Cybercrime and Digital Forensics, 2009

The International Conference on Digital Forensics and Cybercrime in Albany, New York (September 30-October 2, 2009) debated whether standardized methods should be adopted for investigating technology-related cybercrimes. This followed the Digital Forensics Security and Digital Law Conference in Pretoria, South Africa (July 22-24, 2009), which focused on safeguarding computer-transmitted and web-based information from cyber threats. Phishing remains attackers' predominant method for illegally obtaining sensitive data. Digital covering is even more important when it comes to cybercriminals, especially those involving copying/piracy. To support the examination of crime cases that imply digital transgressions,

digital law needs enhancement with civil and criminal consequences for breaches of digital forensic services.

17. Council of Europe, Fifth Annual Conference on Cybercrime (2010) Held on March 25, 2010 under the auspices of the European Parliament's Committee on Civil Liberties, the conference centered on two primary objectives: (i) reducing accessibility of child pornography online and (ii) developing network architectures to strengthen IT security against cybercriminal activities. Participants generally agreed that ongoing legislative enhancements were needed regarding cybercrime prevention, control, and digital security. Most attendees acknowledged the necessity for greater confidence in information technologies, emphasizing that international cooperation remains crucial for combating web-based offenses. Special attention was given to protecting sensitive financial, commercial, technical, and defense-related data vulnerable to cyber intrusions. Delegates highlighted challenges in internet jurisdiction, where determining the location of offenders and victims proves difficult due to the borderless nature of digital spaces. They proposed that formal legal recognition of digital records could significantly improve cybersecurity frameworks.

18. The April 2010 UN Crime Prevention Congress enabled participating nations to strengthen existing global measures against cybercrime threats. Member states resolved to launch coordinated efforts against digital offenders, with particular focus on transnational cyber fraud operations and internet-facilitated terrorist activities.

19. August 2010 saw the Fourth International Conference on Cyber Law.

The event occurred in Virginia, USA, from August 18-20, 2010, focusing primarily on developing digital forensic capabilities against global cybercrime, protecting online privacy, and safeguarding intellectual property in digital environments. These recurring international conferences demonstrate the global community's sustained efforts to control and prevent cyber offenses. Simultaneously, numerous countries have enacted their own national cybersecurity legislation.

2.5 OECD member states have typically established legal and regulatory systems to address financial sector cybercrime, generally comprising five key components:

1. Dedicated Cybercrime Laws: Statutes prohibiting illegal system access, data manipulation, and malware development/distribution (e.g., UK's Computer Misuse Act and similar laws in other OECD nations).

2. Data Security Mandates: Requirements like the EU's GDPR and equivalent OECD country laws obliging banks to safeguard customer information and disclose breaches.
3. Financial Industry Standards: Sector-specific cybersecurity guidelines from regulators including central banks and financial authorities (ECB, FCA, APRA, FSA) covering operational resilience, risk mitigation, and incident disclosure.
4. AML/CTF Protocols: Frameworks essential for tracing and recovering illicit proceeds from cyber offenses.
5. Global Collaboration: OECD members participate in cross-border cybercrime initiatives through Interpol, Europol, and mutual legal assistance agreements.

2.6 CYBERCRIME AND CYBERSECURITY IN THE ASIA PACIFIC REGION [14]

The accelerated adoption of emerging digital technologies including blockchain, cloud services, and IoT has simultaneously introduced new security gaps in both consumer and enterprise systems that malicious actors increasingly exploit. Worldwide cybercrime losses now exceed $7 trillion USD according to current estimates, and it is expected to rise rapidly over the coming years. IoT malware infections alone have recently topped 100 million worldwide. Owing to its swift digitization and elevated uptake of contemporary technology, the Asia-Pacific area is presently among the primary hotspots for cyberattacks.

Cyber security in APAC

Leading the way in APAC on the national cybersecurity index are Malaysia, Singapore, and South Korea. The index evaluates how ready each nation is to stop and handle cyberattacks; all three have established central government agencies with a focus on cybersecurity. Five APAC nations are among the top 15 globally in terms of cybersecurity revenue, with China coming in second place to the US. Network security is the top cyber solutions category in these five major regional marketplaces. While there are always new technological advances to adopt, which poses unprecedented hazards to consumers' and businesses' digital security, technologies like Artificial intelligence (AI) and machine learning (ML) have proven effective in countering cyber threats. Research conducted among APAC businesses reveals these technologies serve multiple cybersecurity functions, particularly in vulnerability assessment and strategic recommendation systems.

[14] Leander von Kameke, Apr 8, 2024 https://www.statista.com/topics/11226/cybersecurity-and-cybercrime-in-the-asia-pacific-region/#topicOverview

Cybercrime in APAC :-

Cybercrime in Asia-Pacific (APAC) banks is a significant and growing threat, owing to fast digital transformation, increased internet usage, and the region's economic potential. Several major patterns and instances emphasise the expanding threat landscape:

Key trends:

Supply Chain Attacks: A significant vulnerability in which attackers target third-party vendors (software, technology providers) to obtain access to banks' systems and consumer data. Recent occurrences involving DBS Bank and Bank of China's Singapore office highlight the implications of compromised printing providers.

Third-Party Risks: According to S&P Global, third-party breaches are the most pressing issue for APAC financial institutions, which is exacerbated by a skills deficit in cybersecurity.

AI-Powered Attacks: Cybercriminals are increasingly using advanced AI to conduct sophisticated phishing attacks (mimicking voice and tone).

Lack of Exposure Management: According to research, APAC's top financial institutions do not manage exposure, leaving many internet-facing assets open to exploitation due to obsolete security standards and misconfigurations. Cybercrime-as-a-Service: The emergence of underground economies where cybercrime tools and services are easily accessible lowers the barrier to entry for attackers.

For cybersecurity companies, the region's rapid digital expansion is a constant challenge. Throughout APAC, some of the most vulnerable industries to cyberattacks are very significant. Cybercrime has increased in the manufacturing sector in recent years due to the possibility of targeting production facilities and any point in the supply chain. This has an impact on industries like semiconductor and automotive manufacture, two of which have multiple APAC markets ranked among the top global production hubs. One of the biggest supply chain assaults globally occurred in 2022, involving Japanese Toyota supplier Kojima Industries, whose manufacturing process was temporarily stopped by a ransomware attack. Infostealers, cryptominers, and versatile malware are further forms of cybercrime that are regularly reported in the Asia-Pacific region.DBS Bank and Bank of China Singapore experienced ransomware attacks on their printing providers, compromising customer data. Latitude Group Holdings (Australia): A third-party vendor compromised 14 million client records, resulting in a serious data breach.Medibank (Australia): Millions' personal information was compromised after attackers stole credentials from a third-party IT services provider. Impersonation frauds

targeting bank customers have increased in Australia and Singapore, causing significant financial losses.

Key insights

Country with the highest data breach density	**Australia**
Highest cyber security revenue growth	**South Asia**

2.7 CYBERCRIME AND CYBERSECURITY IN AUSTRALIA[15]

Both the likelihood of cybercrime and the risk of cyber security breaches are rising in Australia. The globe has become more digitally connected, which has given hackers additional chances. A large portion of the world was compelled to work from home or remotely due to the COVID-19 pandemic, which exposed businesses to a variety of new IT requirements and security threats. To comply with these new regulations, organisations have to quickly adapt and create and apply cybersecurity procedures; this job is far from over. With the speed at which technology is developing, both individuals and organisations need to prepare for the possibility of cyber-attacks, which can include virus attacks, online scams, identity theft, and data breaches, to mention a few.

The price of cyber safety

Cybersecurity expenditures remain substantial, with Australian data breaches typically incurring costs around $3 million per incident, but there are other factors at stake besides money. Cyberattacks have long-lasting effects on businesses all around the world, such as tarnished brand reputations, lost revenue, and trouble luring in new clients. Maintaining a safe and efficient system can be expensive. Australia's cybersecurity sector was projected to reach 4.5billionin2022, markinga4.5*billionin*2022, *marking* billion increase from 2019 levels, as companies increasingly allocated larger annual budgets for digital protection measures.

Data breaches in Australian banks:-

[15] Christopher Hughes Apr 19, 2024 https://www.statista.com/topics/10175/cyber-security-in-australia/#topicOverview

Data breaches in Australian banks remain a severe and continuous concern, with multiple events emphasising the financial sector's susceptibility and the sensitive information of its consumers. Here's an overview of recent events and trends:

Recent Data Breach Events: April 2025: A large number of login credentials for major Australian institutions, including Commonwealth Bank (Commbank), ANZ, NAB, and Westpac, were discovered on the dark web and **Telegram. This** included more than 31,000 sets of credentials. Investigations indicated that this was not a direct breach of the banks' systems, but rather the result of infostealer malware infecting individual user devices (phones and laptops).

Although the Australian Cyber Security Centre records tens of thousands of cyber incidents annually, two major Australian corporations faced significant breaches in 2022. Telecommunications provider Optus and health insurer Medibank both experienced network infiltrations that exposed sensitive personal data belonging to millions of customers. Cybersecurity represents a pressing concern impacting not only large corporations but also SMEs and individual citizens. While technological progress has increased global connectivity, it has simultaneously created expanding opportunities for cybercriminals. Despite security innovations keeping pace with market needs, malicious actors continue exploiting vulnerabilities in cyber defenses and applications. Implementing fundamental protective measures and increasing cybercrime awareness remain essential initial steps for organizations and individuals to enhance their security posture against potential attacks.

Key insights

Global avg cost of a data breach	**4.45bn USD**
Share of victimized companies that paid ransoms	**72.7%**

2.8 CYBERSECURITY IN CHINA [16]

[16] Daniel Slotta Dec 12, 2023 https://www.statista.com/topics/11680/cybersecurity-in-china/#topicOverview

Crime increases along with the digitalization of the world. Cybercrime has been one of the threats with the fastest global growth. China, one of the most influential nations on the planet, is a major player in cyberspace as both a victim and an alleged offender. As a result, as businesses, government agencies, and individual customers work to protect themselves from this danger, the cybersecurity industry is expanding.

In China, cybersecurity was a relatively tiny field, but it was very important. Cybersecurity brought in only about 140 billion yuan out of the over 11 trillion-yuan yearly revenue of the software industry. Considering that cybercrime costs more than one trillion yuan annually, the industry was vital to every part of the nation despite its small size. Furthermore, the projections indicated that they would rise at an exponential rate in the years to come.

To address growing cyber threats, China implemented multiple legal frameworks. Four primary agencies oversee digital governance: the People's Bank of China, Cyberspace Administration, Ministry of Public Security, and MIIT. The nation created an extensive regulatory structure via three core laws - Cybersecurity Law, Data Security Law, and Personal Information Protection Law - clearly reflecting official acknowledgment of these technological challenges.

The fog of digital war:-

China faces significant vulnerabilities in global cyberspace. While foreign adversaries accuse the country of state-sponsored hacking against international businesses and infrastructure, Chinese entities remain equally exposed to cyber threats. Domestic offenders commit numerous cybercrimes, often operating from safe havens like Saudi Arabia, Cambodia, and Myanmar. External dangers also persist, exemplified by the November 2023 ransomware attack on ICBC (China's major bank) by the Lockbit group.

Cybercrime blurs boundaries between nation-states and criminal networks, maintaining its persistent relevance. The associated risks and costs continue escalating, necessitating stronger digital protections for Chinese businesses and citizens. From an industry perspective, this creates commercial opportunities. As cybersecurity awareness and regulations grow, China must rely on its digital security sector to provide protective hardware, services, and solutions.

Key insights

Largest cybersecurity market	**China**
Size of the Chinese cybersecurity industry	**12.6bn USD**

2.9 CYBERSECURITY IN FINLAND[17]

Despite Finland's reputation for excellent levels of cybersecurity in comparison to other countries, cybercrime in its banks remains a difficult and developing concern. Here's an overview of the important features:
Major Trends and Obstacles: Phishing schemes remain widespread. Finland's National Cyber Security Centre (NCSC-FI) regularly issues alerts about active phishing attempts targeting major Finnish financial institutions, including Danske Bank, Nordea. Fraudsters commonly employ fake authentication portals and psychological manipulation tactics to steal login information. As digital transformation accelerates globally, the importance of cybersecurity measures and data safeguarding grows exponentially.

The global cyber domain increases organisations' and individuals' connectedness, but it also makes them more vulnerable to cyberthreats. 2020 saw an increase in cyberattacks' probability and severity as hackers tried to capitalise on the coronavirus (COVID-19) outbreak. The epidemic, the rise in remote work, 5G, ransomware, and most notably the significant data breach at the psychotherapy centre Vastaamo in Finland spurred a public conversation about information security issues. Information security violations and threat notifications increased significantly in 2020 compared to the previous year, reaching a total of about 12,000.

Types of cyber attack

In Finland, there have been fewer serious information security breaches and threats even though 2020 was a challenging year for cyber security. Telecommunications companies reported five significant breaches of information security in that year. In Finland, phishing and online frauds accounted for the bulk of threat cases and information security violations; this trend rose especially in the first half of 2020. Malware infections accounted for roughly 47,000 of the major events recorded in the final quarter of 2020. The majority of harmful software that was detected was unidentified scanning malware, and this percentage rose as remote work grew. Over 10% of all malware attacks on internet-connected smart devices (IoT) were caused by Qsnatch and Mirai.

Attack trends in Finnish companies

Companies are increasingly being targeted by cybercriminals, which makes cybercrime a serious threat to them. Cyberattacks can come in many different forms, including malware,

[17] J. Clausnitzer, Feb 22, 2024 https://www.statista.com/topics/7701/cyber-security-in-finland/#topicOverview

phishing, data breaches, information leaks, and dangerous spam emails intended to trick clients and staff. According to a 2019 survey, nearly two thirds of Finnish businesses saw malware and phishing assaults as the biggest cyber security risk to their operations. Denial-of-service (DoS) assaults, internal system intrusions, and information breaches were among the other main internet dangers facing Finnish businesses. Finland's businesses have identified user carelessness and a lack of knowledge about potential dangers as the primary obstacles to their successful adoption of cybersecurity. Additionally, eighty percent of major corporations claimed that the decentralised model of operation had raised dangers related to information and cyber security in 2020.

Awareness and prevention of cybercrime

In general, cybercrime can be avoided with increased knowledge of the risks associated with using the internet. About 50% of Finns surveyed in 2019 claimed to be reasonably knowledgeable about the dangers of cybercrime. Most Finns were optimistic that they could adequately protect themselves against cybercrime, even though 91% of respondents to the same survey believed that the likelihood of becoming a victim of cybercrime was rising. Avoiding opening emails from senders they don't recognize was the most popular precaution taken by Finns to increase their internet security. In 2019, 53% of people had antivirus software installed, and most of them also used cybersecurity apps or software on their smartphones.

Key sights

No of information security incidents	**1,145,377**
Share of companies who consider cyber security risks significant	**87%**

2.9 CYBERSECURITY IN GERMANY [18]

The term "cybersecurity" denotes protection measures for digital systems like computers. While a relatively modern criminal domain, cybercrime prevalence escalates alongside society's growing dependence on electronic infrastructure. COVID-19 lockdowns forced millions into remote work, dramatically expanding online systems and necessitating enhanced

[18] Statista Research Department, Mar 18, 2024 https://www.statista.com/topics/10499/cyber-security-in-germany/#topicOverview

corporate security protocols. Inadequate system protection exposes organizations to substantial financial damages.

Regulatory Framework: EU GDPR: Germany adheres to the strict General Data Protection Regulation (GDPR) mandating organizational data protection standards.IT Security Act 2.0 (IT-SiG 2.0): Enacted in 2021, this legislation strengthens IT defenses against modern threats like ransomware, while amending the BSIG to expand the Federal Office for Information Security's (BSI) authority over risk evaluations and governmental security benchmarks. BSI: Germany's central cybersecurity agency oversees preventive digital security and critical infrastructure protection.

Types of cybercrime

With the increasing amount of data being kept online, hackers have discovered new ways to interrupt operations or, in more nefarious instances, demand ransom from businesses. Phishing assaults were the most frequent kind of attacks against IT systems in Germany. These most frequently take the shape of emails that ask recipients to divulge personal information. The hacker then sells or uses this information for other malevolent reasons. Another common kind of cyberattack is malware, which is used to infect computers and can result in a number of issues like blocked file access, unusable devices, or even an abundance of advertisements on the desktop.

Another frequent attack that hackers carry out, usually against businesses or institutions, is data theft. Customer information and communications data (messages and emails) were the most often stolen categories of data in 2023. These kinds of attacks frequently encrypt the data and demand a ransom before unlocking it. There are instances where patient data theft and encryption occur in hospitals, for example, where the results can be lethal.

Improving cyber safety:-

Technology will undoubtedly dominate future developments, making cybersecurity enhancements costly but essential for protecting user information. In Germany, the average cost of a cyberattack is approximately 16,000 euros. While this represents a decrease from prior years, it is still a substantial sum of money that businesses must incur. Purchasing cyber insurance can help shield a business from cyberattacks by paying for losses that occur from any type of online hacking or assault. Nearly half of German businesses allocated between 10 and 20 percent of their IT budget on IT security in 2023.

There is general agreement that cyber security needs to be strengthened, particularly in Germany, despite the apparent delayed uptake of financial protection. In a study on the subject,

nearly all participants concluded that tougher measures should be implemented to combat foreign cyberattacks and that politicians should aggressively encourage security cooperation within the EU.

Key insights

No of cybercrime cases recorded by the police	**136,865**
Financial damage from cybercrimes	**205.9bn EUR**
companies at higher risk of cyber attack	**50%**

2.10 CYBERCRIME IN INDONESIA [19]

Cybercrime in Indonesia's banking sector is a serious and growing risk, threatening both financial organisations and their consumers. Indonesia, with its vast and growing online population, has been a popular target for hackers.

As more companies and customers move into the digital sphere, Indonesia has seen enormous growth in the last ten years. The digital landscape has transformed through growing dependence on online technologies and communication systems, creating unprecedented convenience and possibilities. However, without robust cybersecurity measures to facilitate the continuous advancement and adoption of digital solutions, vulnerabilities emerge that malicious actors may exploit. Indonesia faces increasingly organized and severe cybersecurity threats that endanger national security, businesses, and individual citizens. The country detected approximately one billion suspicious activities indicating potential cyberattacks during 2022, highlighting the urgent need for protective measures to secure digital infrastructure.

Digital opportunities and potential calamities :-

With its exponential rise in recent years, Indonesia has the largest digital economy in Southeast Asia when compared to its counterparts. By fostering and leveraging indigenous talents, the nation has made tremendous progress towards digitization, leading to the creation of multiple domestic tech firms and the multibillion-dollar tech company Go-To. As a result, international technology businesses now see Indonesia to be an even more desirable place to invest, which helps to accelerate the country's digital economy's growth. But these technological advantages

[19] Hanadian Nurhayati-Wolff, Dec 12, 2023 https://www.statista.com/topics/11732/cybersecurity-and-cybercrime-in-indonesia/#topicOverview

have also given rise to possible digital disasters in Indonesia. They increase the risks facing the nation and create vulnerabilities as a result of insufficient cybersecurity defences.

For now, the cases of phishing and data breaches are very rampant in Indonesia. The internet data breaches in 2022 were estimated at almost 15 million, but they only added more queries about the nation's data protection. Indonesia has failed to respond to the fundamental cybersecurity demands; Hence, the nation becomes vulnerable to attack Being since there are few cybersecurity personnel needed to counter the said dangers, and the public is ignorant of the real cyber threats. With a mere 63. With a National Cyber Security Index (NCSI) score of 64, Indonesia continues to face difficulties in implementing effective prevention and response measures against cyber threats. This challenge is further reflected in the country's modest cybersecurity market revenues, despite currently holding the sixth position in the Asia-Pacific region.

Companies' readiness for cyber resilience:-

In Indonesia, digitization has also accelerated due in large part to the COVID-19 pandemic, particularly among businesses. The health issue not only pushed businesses to go online, but it also popularised the idea of working from home. As a result, following the epidemic, remote workforces and hybrid workplace models have become increasingly common. Cybersecurity issues for businesses today extend beyond asset protection. Additionally, they must safely connect several devices in various places from various networks within the company, which, if done incorrectly, might create potential threats.

Companies now need to be more cautious against new and quickly developing cyber dangers due to the adoption of the new hybrid workplace model and other technological improvements. In order to establish cyber resilience and safeguard their assets, proper cybersecurity solution deployment is necessaryCurrently, just 39% of Indonesian enterprises have reached full cybersecurity readiness maturity, indicating significant progress remains necessary to achieve true cyber resilience.

Key insights

Ranking in the cybersecurity market	**6th**
Share of business with a cyber incident	**52%**
National Cybersecurity Index ranking	**63.64**

2.11 CYBERSECURITY IN ISRAEL [20]

Israel has gained technical prowess in cybersecurity in recent decades, making it a vital sector of the Israeli economy. In a time of cyberwarfare and cybercrime, there is a great need for specialists in this area. IVC Research Centre reports that there were 23 cybersecurity company departures from Tel Aviv in 2021. Within the city's high-tech sector, this industry saw the most number of exits that year. Certain exit transactions, such as high-value M&A and buts, are noteworthy. Israeli cybersecurity firms provide a range of defences against various online dangers, with a focus on data security. According to estimates, the nation's cyber security income will rise steadily to $1.43 billion by 2028.

Cybercrime is a major concern :-

Like many other nations, Israel frequently deals with a variety of cybercrimes. Information theft or the unauthorised use or dissemination of data was the most prevalent kind of cybercrime in 2021, according to a government report. Online sexual harassment and personal threats also exist. These kinds of crimes use social media as a forum. Men and women are nearly equally the targets of cybercrimes when looking at the identities of cybervictims. An additional Israeli poll found that 6.9% of cybercrime instances in Israel included men. It was somewhat greater than the six percent female cybercrime victim share.

A high number of cybersecurity companies :-

There are a lot of cybersecurity businesses in Israel. There were 469 cybersecurity companies operating in Israel in 2021. Over the past ten years, the number of businesses in this industry has steadily expanded. In terms of growth, 2022 was a difficult year for the Israeli high-tech industry. In fact, less investments were made in local cybersecurity startups annually in 2022—99—than the previous year. On the other hand, the quantity of investments has progressively increased since 2015. Checkpoint is the most prosperous cyber security business in Israel. The business is well-known for creating firewalls, VPNs, and other cutting-edge cybersecurity products. The amount of money invested in regional cybersecurity firms in 2021 was 2.2 billion USD. When compared to the prior year, this represented a rise.

Key insights

Revenue of the cybersecurity market	**880m USD**

[20] Eyal Lichter Dec 21, 2023 https://www.statista.com/topics/10918/cybersecurity-in-israel/#topicOverview

Average spends per employee in the cybersecurity industry	**208.3 USD**
Value of investment in cybersecurity companies	**3.5bn USD**

2.12 CYBERSECURITY IN ITALY [21]

In today's technology-driven society, where digital tools are essential for both work and leisure, securing our everyday devices and online services has become critically important. Cybersecurity (also referred to as information technology protection) involves defending computer networks and digital information from internet-based threats. As global digital interconnection expands, so does the risk that malicious hackers may compromise personal or corporate data and systems. Italy exemplifies this trend, having experienced a significant surge in cyberattacks across multiple sectors in recent years, particularly targeting government institutions and ICT (information and communications technology) infrastructure.

Many different cyber attacks

A cybercrime is a malicious effort made to corrupt, manipulate, or even steal data in a computer, and even to exploit a network. Cyber-attacks are of many types; two of which are malware and ransomware cyber-attacks. Cyber espionage, cyber warfare, hacktivism and the large-scale cyber attack's called distribution denial of services (DDoS) are other subcategories under cyber exploitation. New pattern of DDoS attacks show that the situation has worsened over the last five years.

The Italian cybersecurity market :-

IT security solutions, which aid in preventing unauthorised access to data, are used by individuals and businesses to fend off cyberattacks and safeguard their digital assets. Over the past few years, Italy's cybersecurity market has grown steadily, and in 2022, The market is projected to grow to nearly two billion euros, with cloud and SMS services constituting the dominant segment at approximately 655 million euros during that period.

IT security solutions:-

Italy's cybersecurity solutions encompass IAM (Identity and Access Management), vulnerability assessment, risk and compliance management, along with Security Information and Event Management (SIEM) and vulnerability management. Security infrastructures

[21] Statista Research Department, Jan 10, 2024 https://www.statista.com/topics/4102/cybersecurity-in-italy/#topicOverview

additionally utilize big data analytics, cloud computing, artificial intelligence (AI), and machine learning (ML) to identify network anomalies and detect emerging threats..

Key insights

Cybersecurity market size in Italy	**1.85bn EUR**
IT service ASPE 2023	**41.6 EUR**

2.13 CYBERCRIME IN JAPAN [22]

In contemporary Japan, where digital technologies play a crucial role in cashless transactions, telehealth services, and remote work, cybersecurity issues have gained substantial prominence. The growing economic and social importance of digital capabilities has highlighted cybercrime concerns, with 2019 data showing online banking fraud cases causing financial losses exceeding 2.5 billion yen. The death of a female professional wrestler known as Hana Kimura as well as a cast member on a reality TV show in June 2020 proceeded to advance cyberbullying to a large social issue. The police said that the numbers of ransomware attacks targeting businesses increased in both 2021 and 2022. That is why, based on the analysis of resolved cases of cybercrime, such offences are distinguished: swindle, violation of the law against the production, distribution, purchase, sale, exhibition, transfer, or possession of child pornography and prostitution and cyber terrorism against computers or electromagnetic records.

Growing problem awareness Japan's growing focus on cybersecurity stems from its internet-dependent economy, advanced electronics sector, automation technologies, geopolitical position, and strained regional relations. While Japanese policymakers initially responded slowly to these threats, the nation has since implemented measures to strengthen its cyber defenses. The 2020 Tokyo Olympics and the "Society 5.0" digital transformation initiative provided strong motivation to enhance protection against domestic and foreign cyber threats. The 2018 revisions to the Telecommunications Business Act introduced key changes, authorizing NICT to perform active monitoring of IoT networks to mitigate DDoS threats. In 2022, Japan's National Police Agency also formed a specialized unit focused exclusively on cybercrime investigations.

[22] Statista Research Department, Dec 19, 2023 https://www.statista.com/topics/5186/cyber-crime-in-japan/#topicOverview

Information security measures While law enforcement has achieved greater success in solving cybercrime incidents,businesses and private citizens do not only depend solely on government agencies to protect them from cyberattacks. A survey conducted among Japanese organisations revealed that nearly all of them have put information security measures in place to fend off cyber attacks. The poll also revealed that the most popular information security strategy used by businesses was the installation of antivirus software on PCs and other devices. Tools and services that promise to enhance information security have become essential due to the growing dependence on the internet, not just for corporations but also for many individuals using personal devices to access the internet. This is particularly true given how widespread cell phones have become in the 2010s.

Key insights

Number of cleared cybercrime cases	**12.4k**
The leading type of cleared cyber crime	**Fraud**

2.14 CYBERCRIME AND CYBERSECURITY IN POLAND [23]

Polish internet users most commonly encounter spam, hate speech, and digital piracy as their primary online concerns.. According to the network risks map, objectionable and unlawful content is the most frequent issue facing Polish Internet users. This group contains copyright-violating content, spam, and illegal stuff (such paedophilia). Regretfully, the scope of risks brought about by the internet is expanding annually, and this pattern is certain to persist.

Cyber attacks :-

The majority of cyberattacks that were recorded in Poland involved malware, such as trojan horses, rootkits, viruses, and dialers. An email purporting to be an invoice, notification, or document from a reputable organisation that contained text files or an internet address for downloading malware was an often seen attack. Hackers knowingly employed a variety of software programmes, including ransomware and malware known as "bankers," which targets users of online and mobile banking. Numerous well-planned, coordinated, and targeted

[23] Adriana Sas Dec 21, 2023 https://www.statista.com/topics/5582/cyber-crime-and-cyber-security-in-poland/#topicOverview

campaigns have led to this concerning consequence. One of the most common ones involved sending phoney bills via email links or risky attachments.

The quantity of phishing websites remained extremely high in 2022. Two kinds of frauds were the most common among the thieves. Phishing on Facebook was the first one. This technique is based on pretending to be the owner of a Facebook account and requesting a transfer via the BLIK mobile payment system in private messages to those who have been added to the account's "friends" list. Phishing attacks involving spoof websites for international services, such PayU and DotPay, were reported as the second most frequently. The second well-known phishing attempt was a spoof of PayU and the quick payment provider DotPay.

Cybercrime in business:-

In its broadest sense, cybercrime poses a serious risk to businesses. A genuine threat to corporate security, according to the majority of companies, is dissatisfied or bribed personnel, organised cybercrime gangs, and cyber terrorists. Is there a way to effectively defend against cyberattacks? In both the public and private sectors, cybersecurity concerns about terminal equipment—that is, smartphones, tablets, laptops, desktop computers, printers, and multifunction printers—need significant funding and training. In the upcoming years, businesses will face the difficulty of providing sufficient cyber protection for their operations and educating staff members on the responsible use of terminal equipment while carrying out their jobs.

Key insights

Value of cyber security market	**2.5bn PLN**
Forecast of the cyber security market revenue	**1.16bn USD**
Leaders in cyber security	**Bank**

2.15 CYBERCRIME IN RUSSIA [24]

Russia remains the world's leading origin of phishing attacks, generating more than 30% of global spam emails in 2023. On January 16, 2023 alone, Russian-originated spam emails reached 7.03 billion, placing the country fifth worldwide for spam volume. Meanwhile, domestic cybercrimes targeting Russian users - including malware infections, data breaches,

[24] Statista Research Department, Apr 18, 2024 https://www.statista.com/topics/7335/information-security-and-cyber-crime-in-russia/#topicOverview

and online fraud - have shown significant growth. Industry experts project that Russian consumer spending on cybersecurity solutions will grow to 132 billion rubles by 2025.

State of cybercrime in Russia:

Russian cybersecurity statistics reveal that approximately 20% of personal computers encountered malware infections annually, while 10% fell victim to phishing attempts. The most common consequence of data breaches involved compromised personal information, encompassing names, email and physical addresses, along with individual insurance policy details. Additionally, sensitive state and corporate confidential information was frequently exposed. In 2023, Russia ranked second globally in compromised online accounts, with over 78 million affected users, surpassed only by the US.

Kaspersky Lab, Russia's leading cybersecurity firm headquartered in Moscow, delivers global antivirus and endpoint protection services, achieving over $752 million in worldwide revenue during 2022. Softline, another major Russian IT enterprise established in Moscow, offers comprehensive digital services including diverse cybersecurity solutions**,** and is active in Eastern Europe, the Americas, and Asia, is the second-highest earning company. The Citadel firm group, the biggest manufacturer of legal interception equipment in the nation, comes in second.

Since the Feb 2022 invasion of Ukraine Russian state authorities themselves reported an increase in cyber attacks on them. From 2025, public institutions of the United States were banned from importing a new generation of security software for critical infrastructures. Two web security companies which left the Russian market are Avast and DigiCert. Also, Kaspersky Lab joined the list of businesses that the Federal Communications Commission (FCC) in the United States concluded could be dangerous to the country’s security in March 2022. More users have shown concern regarding VPN solutions because of the Russian government’s actions aimed at Facebook and Instagram. This work describes the growth of the domestic business due to the growing number of Russian users experiencing data leaks and mass foreign providers of information security products withdrawing from the country.

Key insights

Cybersecurity market size in Russia	**3.56bn USD**
Quarterly number of information security incidents.	**473k**

2.16 CYBERSECURITY IN SOUTH KOREA [25]

The ongoing digital transformation and adoption of emerging technologies have made the internet ubiquitous, significantly expanding cyberattack risks for both individuals and businesses. The COVID-19 crisis accelerated this shift toward digital platforms, particularly affecting mobile banking, e-commerce, virtual education, and e-government servicesTo address the pandemic's financial consequences and facilitate digital transformation, South Korea's Ministry of Science and ICT launched the Korean Digital New Deal in June 2020, emphasizing web-based technological innovations. Prior to this initiative's introduction, the nation had already witnessed escalating vulnerabilities to cyber risks including data breaches, ransomware attacks, and multiple forms of IT security breaches.

Cybersecurity industry:-

The South Korean government increased research and development spending in the information security sector in compliance with the Digital New Deal. They also have plans to provide more capacity for the information security staff, which is already expanding. The cybersecurity industry has demonstrated independent growth, with revenues expanding proportionally to increasing security demands. While physical security products - including surveillance systems, biometric devices, and automated electronic security - remain dominant in sales, digital information security solutions have also shown significant market expansion..

The most common type of cyber attacks:-

Malware remained the predominant tool in online hacking incidents despite a previous decline in malicious websites before their 2022 resurgence. These harmful platforms aim to distribute damaging code or infect devices. Malware encompasses all detrimental programming, including viruses and Trojans, capable of compromising operating systems or exposing sensitive data. Although malware attacks represented the most common corporate IT security violations, data breaches were considered the most severe cyber threats.

New security risks:-

The Digital New Deal adopted a DNA (Digital, Network, AI)-focused strategy to advance South Korea's cybersecurity industry and supporting infrastructure. This approach involves implementing artificial intelligence and 5G networks across both public institutions and private enterprises. The plan also calls for the creation and implementation of digital management systems for smart city infrastructure, healthcare, and education. All of this is meant to facilitate

[25] Nina Jobst Jan 19, 2024 https://www.statista.com/topics/9530/cyber-security-in-south-korea/#topicOverview

access and boost economic growth, but it also increases the possibility of widespread cyberattacks, particularly concerning more recent technology like artificial intelligence. Thus, it is unclear how these novel dangers will be handled.

Key insights

Total cyber information security sales	**5.6tr KRW**
Average cost of data breaches	**2.79m USD**

2.17 Conclusion:

In conclusion, the chapter on cybercrime from an international perspective highlights the complex and borderless nature of digital threats, emphasizing the need for global cooperation to combat them effectively. Cybercrime transcends national jurisdictions, with attackers often operating from one country to target victims in another, making legal enforcement and prosecution challenging. The chapter underscores the importance of international treaties, such as the Budapest Convention on Cybercrime, in harmonizing laws and facilitating cross-border collaboration among law enforcement agencies. It also examines the disparities in cybercrime legislation and technological capabilities between nations, which cybercriminals exploit to evade justice. Additionally, the discussion reveals how geopolitical tensions and state-sponsored cyberattacks further complicate the global cybersecurity landscape. To mitigate these threats, the chapter advocates for stronger public-private partnerships, capacity-building initiatives in developing nations, and the adoption of advanced technologies like AI for threat detection. Ultimately, a unified international approach, combined with robust legal frameworks and shared intelligence, is essential to safeguarding digital ecosystems and maintaining trust in the interconnected world of finance, governance, and commerce.

Chapter 3: Analysis of Cybercrime in the banking sector and its legal provisions in India

3.1 Introduction

India faces growing economic and social vulnerabilities as cybercrime has risen dramatically in recent years. The country's expanding digital landscape and widespread internet adoption have created more opportunities for criminals to exploit security gaps and conduct illegal activities. This analysis explores cybercrime's substantial impacts on India's economy and population while emphasizing the critical requirement for effective countermeasures.

As one of the world's largest digital markets, India has experienced considerable financial damage from cyber incidents. These occurrences are directed toward people, companies, and financial institutions, resulting in immediate financial losses and a decline in customer confidence. Cyberattacks also interfere with corporate activities, which is very detrimental to Indian firms. They stifle productivity, damage supply chains, and paralyze vital infrastructure, all of which obstruct economic growth and progress. he growing reliance on technology, coupled with gaps in cybersecurity infrastructure and awareness, has made the banking sector vulnerable to financial losses, reputational damage, and regulatory scrutiny. This chapter examines the evolving landscape of cybercrime in Indian banks, analyzing common attack vectors, notable incidents, and the legal and regulatory framework designed to counter these threats. It also explores the role of cybersecurity measures, employee training, and customer awareness in mitigating risks. By understanding these challenges, stakeholders can develop stronger defenses to protect India’s financial ecosystem from the rising tide of cyber threats.

3.2 An overview of cybercrime in the banking sector[26]

Cybercrimes encompass illegal activities conducted via the internet or computer systems. Essentially, these digital offenses involve unauthorized access through electronic devices and online networks to commit unlawful acts.In today's globalized environment, banks provide diverse services like credit facilities and online banking. Customers enjoy round-the-clock access to financial services through internet and mobile platforms, irrespective of location. While these digital conveniences offer significant benefits, they simultaneously create vulnerabilities to malicious activities like hacking and phishing schemes.

[26] An overview of cybercrime in the banking sector https://www.legalserviceindia.com/legal/article-7694-an-overview-of-cyber-crimes-in-banking-sector.html(09/2024)

3.3 Provisions of cybercrime under the Indian legal scenario. [27]

Key provisions of the Information Technology Act, 2000, addressing banking sector cybercrimes

The IT Act, 2000, was enacted to regulate digital transactions and counter cyber offenses in India. Several of its sections directly apply to digital crimes affecting financial institutions, with specific relevance to banking operations. The main clauses of the IT Act of 2000 that apply to cybercrimes in the banking industry are listed below:

1. **Section 43**: Compensation and Penalties for Computer, Computer System, etc. Damage. This part, which addresses data theft, unauthorised access, and system damage, is crucial.

   Application to banks: Section 43 violations occur when cybercriminals infiltrate banking systems to transfer funds illegally, compromise customer information, or disrupt operations. Affected parties, including financial institutions or account holders, can seek financial compensation for such breaches.

2. **Section 43A**: Restitution for Noncompliance with Data Protection Companies or organisations (including banks) that handle sensitive personal data are especially covered by this section.Important point: A bank (as a body corporate) is responsible for compensating the impacted party if it fails to implement reasonable security standards and this results in unlawful loss or gain.Relevance to banks: Banks hold vast amounts of private and sensitive financial information. Under this provision, liability may result from any careless data breach or leak (such as from inadequate encryption or insecure APIs).
3. **Section 66**: Offences Associated with Computers (Criminal Liability)
4. The criminal equivalent of Section 43 is this.A crucial clauseAny act specified in Section 43 that is carried out dishonestly or fraudulently is considered a criminal crime and is punishable by up to three years in prison and/or a fine of up to ₹5 lakh.Application to bank:Section 66 would apply to hacking into a bank's system to steal data or move money unlawfully.
5. **Section 66C:**

[27] Punishment for cybercrime under Indian constitution https://www.freelaw.in/legalarticles/Punishments-for-Cyber-Crime-Under-Indian-Constitution#:~:text=Section%20500%3A%20It%20states%20that,dealt%20with%20as%20per%20the(06/2024)

Theft of Identity Using someone else's password, digital signature, or biometric information dishonestly or fraudulently is covered in this section.

Relevance to banks:

In order to carry out illegal operations, cybercriminals frequently steal login passwords for online banks. Under this clause, such behaviour is punishable by up to three years in prison and a fine of up to one lakh rupees.

6. **Computer-Based Identity Fraud (Section 66D)** Encompasses Online phishing schemes, fraudulent web platforms, and SMS/email impersonation designed to deceive individuals for financial gain.

   Banking Implications: Criminals commonly mimic bank representatives or create counterfeit banking portals to defraud customers. These offenses are punishable by up to three years imprisonment and fines reaching one lakh rupees.

7. **Section 72A:** Information Disclosure in Contract Violations Goals:

   disclosure of personal data for profit or malicious purposes by intermediaries or service providers without authorisation.

   Application to banks: This clause penalises third-party vendors who handle consumer data (for example, credit card processing) if they reveal it without consent.

Bharatiya Nyaya Sanhita (BNS), 2023[28]:

1. **Section 111 (Organized Crime)** This provision defines organized crime as ongoing illegal operations encompassing "economic offenses" and "cybercrimes" conducted for the benefit of criminal organizations. Clause (g) specifies that "economic offense" refers to fraudulent activities targeting banking institutions and financial entities. Penalties for organized crime range from a minimum five-year imprisonment to life sentence, plus fines exceeding five lakh rupees. Cases resulting in fatalities may receive capital punishment or alternatively life imprisonment with fines surpassing ten lakh rupees. These measures particularly apply to large-scale, coordinated cyber fraud schemes against banks involving multiple perpetrators**.**
2. **Section 316 (Criminal Breach of Trust):** This provision addresses the unlawful misappropriation or diversion of movable assets through deceptive means. Regarding

[28] Punishment for cybercrime under Indian constitution https://www.freelaw.in/legalarticles/Punishments-for-Cyber-Crime-Under-Indian-Constitution#:~:text=Section%20500%3A%20It%20states%20that,dealt%20with%20as%20per%20the(06/2024)

bank-related cyber offenses, it applies when staff members or authorized personnel improperly exploit their access to digital funds or resources. The prescribed punishment includes imprisonment up to three years, monetary penalties, or both.

3. **Section 318 (Cheating):** This provision addresses situations where an individual deceives another to fraudulently obtain property, secure consent for its retention, or manipulate actions through false pretenses. It specifically covers online banking frauds including phishing, vishing, and similar social engineering schemes that trick customers into revealing sensitive information or authorizing transactions. Offenders face imprisonment of up to three years and/or monetary penalties, with more severe cases warranting sentences extending to five years.
4. **Section 303 (Theft):** This provision characterizes theft as the dishonest removal of movable property without the owner's authorization. Applied to digital contexts, it encompasses illicit transfers of funds or information from banking networks or client accounts. Violations may result in penalties reaching three years' incarceration, financial sanctions, or a combination thereof.
5. **Sections on Forgery (e.g., Section 336**): These provisions address creating counterfeit documents or manipulated digital records intended to mislead. Such offenses encompass fabricating fake online banking interfaces, processing unauthorized electronic payments, or altering financial data systems. Penalties differ based on the specific violation and forgery method employed.

The Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023 serves as India's updated criminal procedural framework. While the Bharatiya Nyaya Sanhita (BNS) specifies criminal offenses, the BNSS outlines the processes for crime investigation, legal prosecution, and judicial proceedings, encompassing cyber-related offenses.

The following are the main, pertinent BNSS provisions:

1. **Section 105:** Utilising Electronic Proof. Digital evidence and electronic records are officially recognised by BNSS. This includes logs, transaction records, emails, CCTV footage, SMS/OTP data, and more. For electronic evidence to be admitted in court, it must be gathered and stored in accordance with established guidelines. Relevance to banks: Digital transaction logs, IP addresses, mobile device records, etc., are important pieces of evidence that are admissible under this section in cases of fraud (such as phishing and UPI scams).

2. **Section 132: Electronic** Communication for Police Action Police can use electronic communication to issue warrants, notices, and summonses. expedites the investigation of rapidly evolving cyber fraud cases.Relevance to banking: Police can take swift action in situations of identity theft or phishing by notifying banks, telecom companies, or digital wallets via digital notices.
3. **Section 185:** Evidence Preservation and Protection. Digital evidence must be stored in a manner that preserves its chain of custody and integrity, according to BNSS regulations.Relevance to banking:crucial for maintaining transaction histories, server logs, and bank logs for a successful prosecution.
4. **Section 254:** Timelines for Fast-Track Investigations Faster trials with set time restrictions are encouraged by BNSS for some investigations, particularly those involving technologically complicated offences.Relevance to banking:Money laundering and quick money transfers are common components of cyber frauds. A prompt investigation aids in speedy justice and fund recovery.
5. **Section 180:** Digital Device Search and Seizure permits the search of digital wallets, servers, mobile devices, and PCs.specifies how to confiscate digital evidence, such as hard discs and gadgets used in bank fraud.Relevance to banking: Under the law, police have the authority to confiscate systems used in fraudulent transactions or illegal ATM access.
6. **Section 185:** Evidence Preservation and Protection

   Digital evidence must be stored in a manner that preserves its chain of custody and integrity, according to BNSS regulations.Relevance to banking:crucial for maintaining transaction histories, server logs, and bank logs for a successful prosecution.

The Digital Personal Data Protection Act (DPDP Act), 2023[29], is a significant piece of Indian law that sets guidelines for protecting people's privacy and regulates the processing of digital personal data. Even though it doesn't define cybercrimes specifically, the Act is essential for protecting financial and personal information, particularly in industries that use a lot of data, like banking.

[29] Punishment for cybercrime under Indian constitution https://www.freelaw.in/legalarticles/Punishments-for-Cyber-Crime-Under-Indian-Constitution#:~:text=Section%20500%3A%20It%20states%20that,dealt%20with%20as%20per%20the(06/2024)

1. **Section 8** Security Protocol Requirements: Financial institutions and data custodians must:

   Implement comprehensive organizational and technical protections to prevent security incidents.

   Promptly inform affected customers and the Data Protection Board about any breaches. Banking Implications: Cyber incidents leading to fraudulent activities (like account compromises or illegal transactions) constitute serious regulatory violations for banks.
2. **Section 9:** Data Breach Reporting Obligations: Financial institutions must report all personal data breaches to India's Data Protection Board and affected customers.Banking Sector Relevance: Institutions face mandatory disclosure requirements and potential penalties when security breaches compromise numerous client accounts.
3. **Section 10** - Personal Data Processing: This part specifies the principles governing personal data processing, such as the necessity for authorised reasons and fair and transparent processing. In the context of cybercrime, criminal actors' unauthorised access or processing of client data would constitute a violation of these standards. Banks must ensure that their data processing activities are safe and protected from unauthorised modification.
4. **Section 11** - Purpose Restriction Clause: This provision mandates that personal information may only be utilized for the data principal's consented purposes or other legally authorized applications.. Cybercriminals frequently intend to utilise stolen data for reasons other than the original objective (for example, fraud or identity theft). Banks must have security procedures in place to avoid the misuse of data obtained through a cyberattack and financial repercussions if cybercriminals take advantage of lax security in bank systems to commit fraud or theft.

   5. **Section 12** - Data Minimisation: Data fiduciaries must collect only the personal data required for the specified purpose. By adhering to this approach, banks can reduce the quantity of sensitive information that could be disclosed or compromised in a cyber incident.

   6. **Section 13** - Data Retention: This provision requires that personal data be retained for no longer than is required to meet the purpose for which it was gathered. Banks should have protocols in place to securely delete or anonymise data that is no longer required, lowering the likelihood that it could be targeted in future cyberattacks.

3.4 India's cybersecurity challenges: threats and strategies[30] DPDP Act's Principal Cybersecurity Issues for Banks:-

1. Insufficient Infrastructure for Cybersecurity

Many banks still use antiquated IT systems, particularly cooperative and rural banks. These systems: Do not have firewalls, encryption, or frequent vulnerability patching. unable to recognise and respond to sophisticated threats.

DPDP Implementation Hurdle: Financial institutions struggle to establish the "appropriate security measures" mandated by Section 8 of the legislation.

2. A Higher Chance of Data Breach

Account numbers, PANs, Aadhaar, credit ratings, mobile numbers, and other sensitive personal information are all stored in large quantities by banks.Risk of cybercrime:Phishing, identity theft, illegal activities, and digital loan fraud can all result from a breach.The DPDP Challenge According to the Act, a breach of this kind can lead to fines of up to ₹250 crore and requires mandatory breach notification.

3. Vulnerabilities of Third Parties (Cloud Providers, Vendors, Fintech) For payment processing, KYC, cloud storage, and customer onboarding, banks are depending more and more on outside tech companies. The DPDP Challenge Banks are nonetheless responsible for data under Sections 5 and 9, even if a third party handles it improperly. This implies that banks need to implement stringent data-sharing policies. must keep an eye on the cybersecurity standards of providers. However, oversight and enforcement are frequently ineffective or uneven.

4. Insufficiently Skilled Cybersecurity Experts: Cybersecurity specialists are in short supply at banks, especially smaller ones. Teams that respond to incidents and data protection officers (DPOs)DPDP Challenge: The Act assumes that data fiduciaries, such as banks, are capable of creating and enforcing intricate incident response and data governance systems, which may not be feasible for everyone.

5. Attacks Using Social Engineering and Phishing Cybercriminals commonly make use of:SMS frauds claiming that "Your account is blocked"Phony banking websites or applications posing as bank representativesCustomers unintentionally divulge credentials as a result of these. DPDP Challenge: Banks may be held accountable for failing to protect personal data if

[30] https://www.drishtiias.com/daily-updates/daily-news-editorials/india-s-cybersecurity-challenge-threats-and-strategies#:~:text=What%20are%20the%20Challenges%20Posed,public%20safety%20and%20national%20security.

such assaults are successful because of a lack of client awareness or a communication security flaw.

6. Data Storage & Transfer Across Borders: Banks that use foreign cloud service providers, such as AWS and Azure, must deal with ambiguity because DPDP only permits cross-border data transfers to authorised nations. An official whitelist has not yet been released by the government. The DPDP Challenge: Legal danger arises from data localisation ambiguity if client data is accessed or maintained in unapproved areas.

3.5 India's Cyber Attack Vulnerability[31]: India's banking industry's digital transition, improving financial inclusion but also making it more vulnerable to cyberattacks. Indian banks are particularly vulnerable to cyberattacks due to the combination of legacy infrastructure, growing digital transactions, and a lack of cybersecurity knowledgeAs per the survey, in 2022, more than 759 million people at least once a month were active on the internet out of the total population of India, it shows the large and developing internet population of India. As for the Internet market or e-commerce, India arrives as the second-largest market after China. It is assumed that by 2025 there will be 900 million persons diagnosed with a non-communicable disease. India digital economy is growing at great pace and most of the sectors of the country are hooked online with services like Heath care, Education, banking sectors, retail, Agriculture etc.

However, because of poor and inadequate cyber security policies and infrastructures, and minimal awareness, hackers can always exploit system vulnerabilities in India. Thus, the country faces systematic challenges from the advanced cyber threats that may originate from state and non-state actors targeted on intervention in the Indian strategic, economic, and political interests. Initiatives like Digital India, UPI, and Jan Dhan Yojana have accelerated.

Major Areas of Vulnerability in Indian Banking:-

1. Banks in the Public Sector with Legacy IT Systems. Numerous public sector banks still use antiquated core banking systems that are susceptible to ransomware, malware, and denial-of-service (DoS) assaults. They provide hackers with easy access points because of patching delays and a lack of real-time monitoring. For instance, malware attacks on ATMs are brought on by antiquated software and inadequate firewalls.

[31] Assessing vulnerabilities in the Indian banking sector https://www.pwc.in/research-and-insights-hub/assessing-vulnerabilities-in-the-indian-banking-sector.html(08/2024)

2. Growth in Fintech Dependency and Digital Payments: Digital banking services, mobile wallets, and UPI have all grown rapidly. These days, banks mainly rely on fintech platforms from third parties, which may not have sufficient cybersecurity protections. Risk: The entire customer data flow could be at risk if one link, such as an API or digital loan aggregator, is compromised.
3. Users' Lack of Cyber Awareness:Phishing, vishing (voice phishing), and SMS scams affect a lot of Indian consumers.To get login credentials and OTPs, scammers pose as bank employees or build phoney banking websites.Result: Social engineering and human mistake continue to be significant danger vectors in spite of robust banking infrastructure.

Recent Banking Cyber Incident Examples in India:-

In 2020, Canara Bank to an exposed server, private financial information was leaked.
In 2018, Cosmos Bank impacted about 10 lakh clients.A malware attack on an ATM compromised 94 crore rupees.SBI in 2021 (via partner)Unsecured server data leak: More than 3 million documents made public .In 2023, numerous cooperative banks were scammed using malware and phishing, and money was embezzled from rural accounts. According to a recent CloudSEK analysis, cybercrime might cost India ₹20,000 crore by 2025. The banking and financial services sector is particularly vulnerable, with a potential loss of ₹8,200 crore. These figures reveal the expanding magnitude of the issue. Finance Ministry reports indicate a 400% surge in major cyber fraud incidents (₹100,000+ transactions) during FY2024, causing financial damages exceeding $20 million (₹177 crore). Reported cases jumped from 6,699 to 29,082 year-over-year.

3.6 The Challenges Indian Banking sectors Face from Cyberattacks[32] :-

1.Many institutions utilise outdated IT systems that are prone to viruses and ransomware.
2.Rising digital transactions, like UPI and mobile banking, increase the danger of cyber fraud and data leakage.
3.Phishing and social engineering sometimes include tricking customers into revealing OTPs and financial credentials.
4.Third-Party and Fintech Risks: Inadequate cybersecurity in partner platforms might expose

[32] Assessing vulnerabilities in the Indian banking sector https://www.pwc.in/research-and-insights-hub/assessing-vulnerabilities-in-the-indian-banking-sector.html(08/2024)

customer data.

5.Misconfigured cloud storage can result in large-scale data breaches.

6.Low cyber awareness among users and staff can lead to increased fraud risk.

7.Underreporting of incidents can compound the damage, as some banks delay or avoid reporting breaches.

8.Cross-border Threats: International cybercriminal networks and advanced persistent threats (APTs) frequently attack India's financial systems.

Critical Infrastructure Risks: Cyber intrusions endanger national security by targeting essential services like energy grids, transportation, and telecom networks. The October 2019 attempted breach at Kudankulam Nuclear Plant exemplifies this threat.

Financial Sector Vulnerabilities: Fraudsters employing money mule schemes or extortion tactics pose severe risks to Indian banks. Attacks on digital payment platforms and banking apps can trigger massive monetary losses, identity theft, and eroded public trust, as seen in March 2020 when hackers stole $2 million from City Union Bank via SWIFT.

Data Security Challenges: India's digital expansion has amplified sensitive data storage, escalating breach risks where unauthorized parties access confidential information. The May 2021 leak of 190,000 CAT exam candidates' personal records demonstrates such vulnerabilities.

Cyber-Espionage Threats: State-sponsored digital espionage targets India's diplomatic, economic, and defense sectors. The 2020 Operation SideCopy incident revealed Pakistani operatives phishing Indian military and diplomatic personnel.

APT Complexities: Sophisticated, prolonged cyber campaigns by hostile groups infiltrate networks stealthily. As evidenced by February 2021's Red Echo report, China-linked APTs compromised India's power grid using advanced malware.

3.7 Supply Chain Vulnerabilities in the Banking Sector:

Within India's banking industry, supply chain weaknesses refer to cyber risks introduced by external vendors, technology firms, fintech alliances, and outsourced service partners. As financial institutions increasingly depend on third parties for IT solutions, cloud platforms, payment systems, security products, and customer-facing applications, the sector's collective cybersecurity resilience becomes dependent on its most vulnerable component.

Banks employ third-party software for core banking, customer relationship management, loan processing, and other functions. If these programs are vulnerable or compromised, attackers could get access to the bank's internal network. Cloud-based solutions are commonly utilised to store consumer data and manage banking operations. A vendor's cloud environment that is

misconfigured or unsecured (for example, open storage buckets or inadequate API access control) might result in large-scale data breaches. Banks frequently outsource IT maintenance, cybersecurity monitoring, and call centre operations. These contractors may not adhere to bank-level security measures, leaving them open to insider threats and credential theft.

Banking-as-a-Service (BaaS) and open banking models rely on APIs to communicate with fintech platforms. Poorly secured APIs or insufficient verification of fintech partners might provide unauthorised access to transaction data and result in API-based data breaches. ATM and POS hardware suppliers and software integrators might pose concerns if their systems are out of date or compromised. Supply chain attacks on these devices may enable attackers to steal card information or influence transactions.

This term describes vulnerabilities in operational technology infrastructure utilized by both public and private sector entities. Malicious actors can exploit these weaknesses to infiltrate connected networks and disrupt critical services, potentially causing severe operational impacts. A notable instance occurred in December 2020 when hackers targeted SolarWinds' network management software, compromising several Indian institutions, including the National Informatics Centre (NIC), Bharat Heavy Electricals Limited (BHEL), and the Ministry of Electronics and Information Technology (MeitY).

Current Cybersecurity Programs: The National Cybersecurity Policy outlines its primary objective as creating a secure digital environment for citizens, businesses, and government entities. It specifies comprehensive goals and methodologies for safeguarding online data, reinforcing cyber infrastructure, enhancing threat prevention/detection capabilities, and minimizing damages through coordinated institutional, human, procedural, and technological measures.

The Cyber Surakshit Bharat Program was launched to establish security protocols and educate government Chief Information Security Officers (CISOs) and IT personnel about cybercrime countermeasures.

The Indian Cyber Crime Coordination Centre (I4C) provides centralized resources to facilitate coordinated law enforcement actions against cyber offenses, fulfilling its designated operational mandate.

Its 7 elements are mentioned below[33]

●RBI's Cybersecurity Framework for Banks, 2016

[33] https://theprayasindia.com/editorial_analysis/06-january-2024-the-hindu/(06/2024)

●RBI's IT Examination (ITE) and Cyber Drills

●Directives for CERT-In (Indian Computer Emergency Response Team)

●The NCIIPC (National Critical Information Infrastructure Protection Centre)

●The threat analytics unit for national cybercrime.

●National website to report cases of cybercrimes.

●Center for the Training of National Cybercrime.

●An organizational unit for the administration of ecosystem management of cybercrime.

●National Centre for locating Cybercrime and innovation.

●On the national level, the ecosystem of the cybercrime forensic laboratory.

●Interpol and regional cybercrime investigation team Internet gateway.

Common Supply Chain Vulnerabilities in Banks:

●Third-Party Software Vulnerabilities: Flaws in bank-owned software developed or maintained by a vendor. Open-Source Dependencies: Risks posed by vulnerabilities in open-source components integrated into the bank's or its vendors' systems. Attackers implant harmful code into legitimate software upgrades provided by suppliers.

●Weak Vendor Security Practices: Vendors with inadequate cybersecurity measures are easily penetrated, allowing access to the bank's systems. Banks may have limited access to their vendors' security postures and the security practices of their subcontractors (fourth-party risk).

●Insider Threats at Vendors: Malicious or negligent personnel within a vendor organisation can deliberately or unintentionally damage the bank's data or systems.Cloud Service Vulnerabilities: Misconfigurations or security flaws in cloud services utilised by the bank or its vendors.Data Security Flaws by Vendors: Vendors mishandling or insufficiently protecting the bank's data.

3.8 Cybercrime and society[34]

The Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre), launched in 2017, aims to create a secure digital environment. Its primary functions include identifying botnet infections across Indian systems and notifying affected users to facilitate malware removal, thereby preventing further compromises. Alongside collecting and analyzing

[34]International Journal of Management, It & engineering, Vol. 8 Issue 10(1), October 2018(o6-2024)

cybercrime data, CERT-In (MeitY's Computer Emergency Response Team) issues regular cybersecurity alerts.

Critical Information Infrastructure (CII) refers to systems whose disruption could severely impact national security, public health, safety, or economic stability. The NCIIPC protects such vital infrastructure across sectors like energy, finance, telecom, transport, government, and defense establishments.

The Defense Cyber Agency (DCYA), the armed forces' specialized cyber unit, handles digital security threats. Its operational capabilities include offensive cyber operations like system penetration, electronic surveillance, data retrieval, cryptographic solutions, and countermeasures against cyber threat actors.

Authors from diverse fields provide distinct insights on cybercrime's influence on society: 1. criminologists and sociologists: Focus: Examine cybercrime as a social phenomenon, including its origins, evolution, and societal implications. Key Perspectives: They investigate how the digital age alters traditional crime, develops new types of deviance, affects social connections and trust, and poses problems to law enforcement. They also discuss the function of social engineering and the spread of vulnerabilities via online platforms. Cybersecurity experts:Focus: Highlight the practical and technological consequences of cybercrime for individuals, businesses, and vital infrastructure.Key perspectives: They emphasise financial losses, operational disruptions, data breaches, privacy violations, and the importance of strong security measures, risk management, and public awareness.

Cybercrime and Society:-

Criminal activities target the very vein of the modern world entrenched in Internet and the high speed of data and information transfer through computers. See, hackers, in the most literal sense of the word, often target people who cannot be considered technologically savvy, yet increasingly are immersed In today's digital era, the internet plays an increasingly central role in both professional and private spheres of life. With regards to this level, cybercrime is understood as the use of advanced skills obtained in the IT sector to deceive other individuals into revealing their SSN or any other account details as well. As for the victim, in some cases it is possible to refund the money or even recreate the stolen identity; however, the incident often causes the victim great psychological trauma and makes them mistrust the Internet and other achievements of the technological age. As such, the cybercriminal denies the latter many of the possibilities that the contemporary data market offers. During the first three quarters of 2017, Indian organizations experienced cyberattacks at a frequency of one every ten minutes. According to CERT-In (India's Computer Emergency Response Team), international cyber

offenses totaled 27,482 incidents globally that same year. Such are the viruses and ransomware, phishing, and site incursion. Cybercrime experts spoke to the ToI regarding Digital India and similar campaigns and said: more people are now going online therefore the necessary equipment has to be installed before and or cybercrime has to be stopped. as cybercrime usually has very high statistics according to the data displayed this year the upcoming statistics will most undoubtedly increase. As per the insights of cybercrime expert Mirza Faizan TOI came to know that the government is in a process to reduce such rates of cybercrime, apart from this, businesses and individuals both have to be ready with a strong and capable team to stop such Types of crimes. The speaker proceeded to say that although the government is doing something, it is ineffective because hackers target hundreds of various systems and enterprises and all of them need to be ready. It is noteworthy that in the last 3.4 years 1. Thus, the total cyber-crimes registered was calculated, out of which 71 lakh cases were recorded in India.It is expected that by the end of December, the general crime will be more than fifty thousand owing to the fact that the current Offset figure is at forty-seven thousand two hundred and eighty-two. The recent years specifically the past three years have experienced a rise in ransomware attacks. Here, the attacker wants some form of monetary compensation; otherwise, information about the victim will be shared. Here, the attacker 'chunks down' the communication channel and demand money in ransom or else they will post the particulars of the victim. The attackers demand bitcoins, virtual money, as the ransom; it is wise to establish a safe mode of handling such kind of payment.

Impact of cybercrime on individuals, businesses, and society[35]

Another growing crime that is breathtaking in its rate across the world is computer or cyber-crime. Pc related crimes on the other hand have risen by an alarming forty percent ever since the coronavirus outbreak, the FBI has reported, PR Newswire. This increases infers that there is need for enhanced awareness and covering as a precaution against cybercrimes.Cybercrime is potentially catastrophic in as far as it destroys individual and corporate reputation, embezzles money and steal individual's identity. Moreover, cybercrime affects several areas of society such as the economy is negatively affected, there are threats to national security, and social issues such as cyberbullying and harassment are promoted.Looking at Norton's study, he realized that 55 million consumers were affected by identity theft in 2021 alone. Once issue of whether or r company are going to be a statistic and become a victim of a cyber-attack that

[35] https://www.linkedin.com/pulse/impact-cybercrime-individuals-businesses-society-join-welance/(09/2024)

statistic is increasing. The good news is that there's action can take to protect r firm and rself. This article will discuss the consequences of cybercrime and what has been done to correct this problem in terms of the individuals, businesses, and society at large; It will also address ways on how to protect oneself in the computerized world by performing preventive measures.

3.9 Cybercrime's Impact on Various Entities: The digital age has escalated cybercrime risks for individuals. Advanced cyberattacks now expose people to greater dangers of monetary theft, personal data compromise, psychological trauma, and damage to their public image.

1. On Individuals

Monetary Damages: Cybercriminals frequently cause financial harm through phishing schemes, system intrusions, and malicious software designed to steal banking credentials, credit card information, and account passwords. Such fraudulent activities often result in immediate monetary losses that prove difficult to recover.

Identity Compromise: A severe consequence of cyber offenses involves the theft of personal identifiers including social security details, license numbers, and birth dates. Criminals exploit this stolen information to create false identities, obtain fraudulent loans, and conduct illicit transactions using victims' legitimate identities.

Financial loss, together with severe legal and administrative repercussions, may ensue from this.

Emotional stress: Cybercrime is more than a matter of losing money or having one's identity stolen; it also entails emotional harm. Crimes in the virtual space often leave people to be filled with fear and tension because they and their data are vulnerable. This could, at some time, be injurious to one's mental health since the isolated person is reluctant to seek assistance. Reputational damage: lastly, the impact that cybercrime has on a person is the damage done to his or her reputation. It puts the criminals at the receiving end since they are likely to post material on the websites that people know has been stolen from them; thus, a decline in their credibility and loss of public trust. Other consequences of reputational damage include difficulty in securing a source of income, especially when one finds it difficult to get a job or even retain one. Direct Theft: Cybercriminals can gain unauthorised access to consumer accounts and steal funds by conducting fraudulent transactions. Unauthorised Card Usage: Cybercriminals utilize compromised payment card details to conduct fraudulent transactions without the cardholder's authorization. Schemes & Fraud: Customers might be duped into freely transferring money to criminals using social engineering techniques like as phishing or "digital arrest" schemes. Recovery Costs: Even if funds are recovered, users may have to pay

fees for challenging fraudulent transactions, replacing cards, and dealing with the aftermath of cybercrime.In India, cyber fraud losses increased to ₹177.05 crore in FY24.

2. On Banking business

Financial loss: Computer crime and especially the offence against the small and medium sized companies presents a devastating impact on the balance sheet. Such an attack results in loss of money, product ideas or consumers' information; and regaining such items may be costly. Since cybercrime financially impacts organizations, organizations may be forced to close in some circumstances.Reputational harm: Actually, cybercrime is something that can significantly and irreversibly damage a company's reputation. Forgot customer information is a common problem where, due to a successful cyberattack, Customers may question an organization's data security competence, potentially resulting in reduced profits, attrition of longstanding clients, and diminished market position.

Legal ramifications: In this case cybercrime can have astrategic legal implication to a firm in that it can lead to the firm being charged with crime. Data breaches trigger legal charges, fines and penalties though prevalent in sensitive industries such as financial and medical industries.Intellectual property loss: It means that not only trade secrets as well as patents are among the types of IPR that might be stolen by cybercriminals from firms. Generally, such losses may prove fatal to companies, especially those which rely a lot on research and development. Such incidents can result in declining revenues, reduced business prospects, and shrinking market presence, potentially threatening the organization's long-term viability. Financial institutions often face extortion demands to regain control of compromised systems and information. Regulatory Consequences: Authorities may impose substantial fines for violations of data security laws following breaches.Client Restitution: Banks frequently must compensate customers affected by fraud or identity theft stemming from cybersecurity failures.

3. On Society

Economic impact: Cybercrime can possibly affect the economy to a large extent depending on the type of operation. Thus, it may lead to direct economic losses to people, firms, and states. The expenses may include recovery of lost data, repairing the existing damage, and preventing future advances. Besides, it may demoralize customer's confidence in the authenticity of online transactions hence affecting the sale and revenue of companies. Cybercrime also results in loss of Intellectual Property; this is a negative impact since industries' innovations and competitons are affected.National security concern: It is a known fact that cybercrime poses a great danger

to all nations, which creates more concern on issues to do with national security. Maneuvers towards military and governmental structures can endanger private information and disrupt various processes. Cybercriminals will also be able to use the technology to obtain state secrets, spy and sabotage essential aspects of society from transport to power. Another application of political and ideological motivations is also observed in cybercrime since it negatively impacts society.

Impact on public safety and healthcare: Cybercrime can pose a threat to any of these two fields of study. Offenses against medical facilities may be lethal since they can threaten people's independent data and disrupt health services. Other manifestations can also affect the safety of people through assaults of critical infrastructures including transport systems and emergency services. Technology may also be as a tool for cyber criminals to try and steal identities which is very detrimental for those who are affected financially. Systemic Financial Vulnerabilities: Ripple Effects: A significant cyber breach at a major financial institution can trigger widespread disruptions, potentially compromising interconnected banks and jeopardizing overall economic stability. Such digital threats may undermine investor confidence, causing market fluctuations and broader economic repercussions.

In conclusion, digital offenses profoundly affect banking customers, extending beyond financial damages to impact psychological health, personal security, and confidence in online financial services. Financial institutions and governing bodies must emphasize customer safeguards through comprehensive security protocols, preventive awareness initiatives, and efficient resolution mechanisms.

3.10 Impact of cybercrime on the Indian economy: -

India's expanding digital economy and increasing technological dependence are making it a prime focus for cybercriminal activities. The nation's sizable population, rising internet adoption rate, and developing digital infrastructure have made it an ideal environment for cybercrime activity. Therefore, comprehending how cybercrime affects the Indian economy is of utmost importance.

Economic impact[36]:

1. Financial loss and damages: – cybercrime does lead to severe monetary losses and victimization of individuals, businesses, and the economy of India. The following are some

[36]Tripti Jaiswal, International Journal of Creative Research Thoughts (IJCRT) Volume 11, Issue 7 July 2023, www.ijcrt.org. (08/2024)

financial effects of cybercrime in India: The following are some financial effects of cybercrime in India:

a. Direct Financial Losses: Cybercriminal acts include fraudulent transactions or money theft or unauthorized access to bank accounts; thus, imply direct financial loss. In many instances related to financial crimes, people and organizations experience negative financial implications.

b. Indirect Financial Losses: Cybercrime occurrences that may not directly lead to a financial hit, they will cause reputations to be damaged and investors to lose their confidence and the customers as well. Such factors can influence the ways of acquiring customers, conducting corporate activities, and the overall economic growth processes.

c. Legal and Regulatory Costs: Many organizations experience cybercrime, leading to expenditure in legal procedures, investigation, and compliance. It intensifies the financial 2. Operational disruptions and efficiency declines: Cyber offenses negatively affect both national economies and individual enterprises by interrupting business continuity and a. Service disruption and downtime: Hacking and Malware can lead to complete unavailability of networks, websites, and online services, for instance, through a DDoS attack. This results in reduced efficiency, dissatisfied customers, and lost revenues.

b. Operational Delays: One of the consequences of a cyber threat is that it is likely to disrupt the normal activities of a firm, for instance, in its supply chain, manufacturing or delivery of services. This leads to economic wastage through hindrances in the provision and distribution of goods and services.

c. Business Continuity Costs: Managers use resources to mitigate cyber risks through investing on cybersecurity, backup systems, and other disaster recovery frameworks. Such costs also aggravate the total financial loss of cybercrime.

3. Economic Espionage and Theft of Valuable Intellectual Property (IP): The economy becomes severely damaged by cyber criminals that raid its IP and perpetrate economic espionage regurlarly. Among the effects are:

a. Intellectual Property Theft: Cybercrime takes valuable information, company secrets and research outcomes and this comes at a cost to companies. This hampers innovation in technologies and steadily declines the competitive edge.

b. Piracy and Counterfeit Goods: Organizations involved in the sales of software, entertainment products or pharmaceutical products, for instance, are some of the benefitting parties since they lose their income to fake products as a result of online sales.

c. Economic Impacts on Industries: Such activities as trade secrets theft and economic espionage cause damage to specific industries of developments by constraining options for growth, investment and employment opportunities. Business sectors such as, technology, Research and Development and the creative industries are most vulnerable to cybercrime. 4. Rising Cybercrime Expenses: Some of the impacts include; Due to the increase in the instances of cybercrime, the companies and the economy at large incurs the cost of enhancing the security of their systems. Among these expenses are:

a. Cybersecurity infrastructure: it is a necessity for organizations to ensure that they adopt strong measures of security which include firewalls, IDS, encryption and security software. Thus, these investments have had an effect of raising operational costs.

b. Workforce and Expertise: In the race against cyber threats, it is evidently expensive to create a workforce with adequate skills in cybersecurity and to procure specialist assistance from external sources. Hiring professionals in cybersecurity and offering training to the staff members leads to added costs.

c. Regulation and Compliance: Because of generally accepted industry trends and regulatory requirements stating that organisations must adhere to cybersecurity best practices, compliance costs have to be incurred. Non-compliance with these regulations may lead to financial penalties or reputational damage for the affiliated organization.

3.11 The need to protect the banking industry from cybercrime:- Security measures in banking, especially cybersecurity, have become very important in the current world. It becomes much more important because credit creation and credit securing constitute the nucleus of the banking business. These five key elements demonstrate why cybersecurity is crucial for banks and require urgent attention: • What is surprising is that it seems as if all people are using electronic money, that is, the credit and debit cards. In this case, need to ensure that all the protection measures in cybersecurity are employed to protect our identity and information.

• Through the cases of data breaches, the banking industry may become an industry that is hard to trust. That is equally a major concern to banks. The lack of proper cybersecurity can make a company vulnerable in a sense that their data can be easily leaked, thus, their clientele might as well be looking for other places to spend their money.

• Essentially, when a bank's data gets exploited, often lose cash and valuable hours. Recovering from the same can also take much time and energy to accomplish. If would involve endorsing statements, suspending cards, and watch out for any problems.

• On the wrong side, our information is as good as dust, as our privacy can be invaded extremely in a way that is unprintable. Even after cancelling compromised cards and resolving fraudulent transactions, criminals can still exploit sensitive cardholder data for identity theft and personal reputation damage.• Banks are relatively more sensitive than other types of undertakings. That is the cost banks have to incur for keeping types of personal information that are as sensitive as that. Cybercrime threats are serious when if measures were not being taken r bank data is likely to be at risk.

Three risks presently associated with banking on the web:-

• Additional dangers posed by mobile apps: Smartphone applications have it that more individuals open their bank accounts through the gadgets. These people do not usually have appreciable security, there is a significantly improved probability of an attack. To prevent the perpetration of a crime, the banking software solutions needed to reside at the end-point.

• Breach incidents at non-affiliated entities: They have been forced to use third party network and shared financial system while banks have upped their defenses. The attackers can easily penetrate these if these are not as secure as the bank.

• A higher chance of cryptocurrency hacks: It also pointed out that hacks have risen in the new-age assets such as cryptocurrencies besides the traditional ones. Thieves have a higher probability of procuring large quantities of this currency because the chain is oblivious to how to apply cybersecurity software for banking in this volatile space. Especially when its value skyrockets.

Using secure software to fend off threats. [37]**:-**Given the present threats that are comprised under the large umbrella of internet security, it is advisable that should consider replacing your current security software or it might be time to consider upgrading it. These are some tells that can be put into consideration in the field of developing banking software.

1. Security audit: However, to execute any new software on the organization's cyber security, an assessment is required. The review also looks at the pro's and con's of the current alignment of the business. It also provides recommendations which may help reduce costs and achieve the right fund allocations possible.

2. Firewalls: Applications are not the only part of a cybersecurity banking setting and therefore, every component should be enhanced. To prevent cases of assault, the right hardware is also required as well. This approach enables bank security systems to intercept suspicious activities

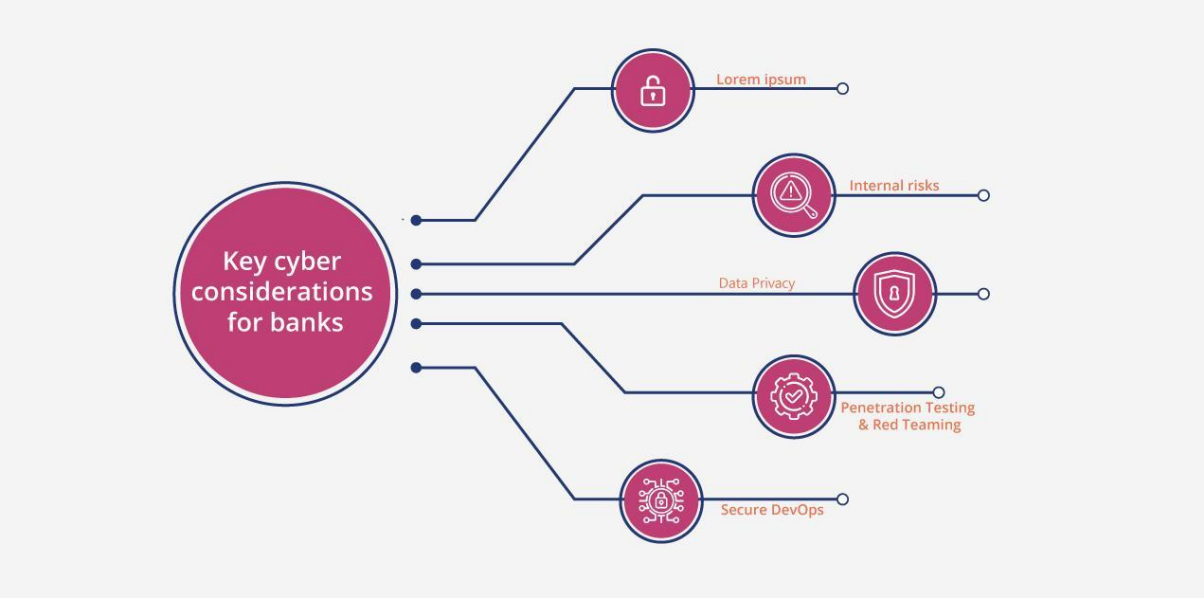
[37] https://www.theglobaltreasurer.com/2019/09/25/the-importance-of-cyber-security-in-banking/

before they spread across networks. Protective software like antivirus and anti-malware programs– our firewall is updated and this makes r security better, but the assaults will not be stopped without new antivirus and anti-malware applications. Particularly, one can come across a situation where the most recent virus signatures and rules may not be incorporated in the old software. Therefore, it can miss a potentially fatal blow on r system possibly by a virus or any other malware.

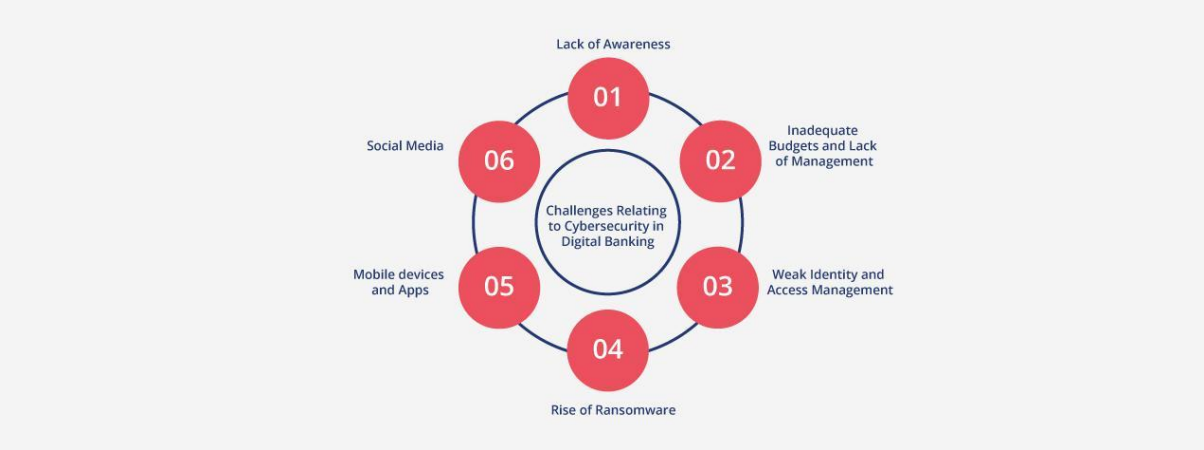
3. A word of advice or caution for banking users of online or mobile apps is the use of multi-factor authentication, or MFA. Many people fail to change the password. If they do, they make slight changes. As a result of provoking an additional level of protection, MFA blocks hackers from gaining access to the network. For instance, using the customer's cell phone, deliver a six digit code.

4. Biometric Among these, the type of MFA that is considered to be safer even than the texted code is Biometric. Used in this type of authentication, one may be required to scan their retina, make a thumbprint or even facial recognition. While this kind of authentication has been employed by hackers in the past, it is more difficult to pull off.5. Automatic logout: Of course, if allowed, a user can stay signed in on many sites and applications at the same time. Therefore, customers can access their account details without repeatedly inputting login credentials during each session. That way, however, makes it more convenient for the attackers to obtain r records. Automatic logout has reduced this by reaching a user's account and expiring it after a few minutes or idle time.

6. Education: Thus, if the above steps are taken, the sector of banking and other related industries can become more safe from cyber threats. But they cannot act when the users continuously download their data from unsafe web platforms or compromise the security of their login information. Education then becomes very significant for this reason. Consumers may change their behavior for such threats to inform them that banks have penalties for these weaknesses.



38



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3.12 Challenges in Implementing Bank Cybersecurity: Several critical obstacles hinder effective digital security adoption in financial institutions. These include:

1. Ignorance

Currently, the level of understanding of cybersecurity among the population is rather low, and not many firms have invested significant amounts to improve it.

2. Lack of management, and still having very small budgets[40]

[38] Cybersecurity in banking https://www.knowledgehut.com/blog/security/cyber-security-in-banking(09/2024)
[39] Cybersecurity in banking https://www.knowledgehut.com/blog/security/cyber-security-in-banking (09/2024)

[40] Cybersecurity in banking https://www.knowledgehut.com/blog/security/cyber-security-in-banking(09/2024)

Climb's budget to cybersecurity usually receives insufficient attention due to its low priority. Actually, top management remains minimally concerned with cybersecurity and does not take a serious approach to the related support initiatives. This might be due to the fact that they provided exaggerated values to these hazards.

3. Access and Identities are not properly controlled

Identity and access management serves as the fundamental framework for cybersecurity infrastructure, not forgetting the recent upheavals instigated by hackers. can have authority and potentially enter a company's network with a single username theft. More has to be done in this respect, despite the progress that has been made.

4. A rise in ransomware

The new and growing threat of ransomware has been brought into our notice by some incidents of computer intrusion. Cyber criminals have begun employing some of the following tacters to be have bypass the endpoint protection tools that are focused on executable files.

5. Apps and Smartphones Modern banking institutions for the most part is oriented primarily

On the use of mobile devices as playing a primary role in materialization of business proposals. For this reason, the base is expanding daily, and the exploiters regard it as the best option. Mobile phones are gradually becoming the lovely targets of hackers because of increased mobile phone transactions.

6. Social Networks Hiring a hacker is easy today because of social media thus making the threat

Higher because more hackers are being employed. The customers with limited knowledge perform activities that make the public data available to hackers.

3.13 :- Digital Arrest :-

A digital arrest is the legal procedure of arresting someone suspected of committing a crime in the digital environment. These arrests may result in actual incarceration, although they are more commonly associated with restrictions on access to electronic devices, digital platforms, and networks. The emphasis is on preventing ongoing criminal activity online, seizing electronic evidence,and safeguarding the public from future harm. Common forms of crimes that result in digital arrests include:

●Hacking involves illegal intrusion into computer networks or systems.
●Phishing constitutes deceptive practices to acquire confidential data like login credentials or banking details by masquerading as trustworthy entities.

●Cyberterrorism employs digital attacks to cripple critical infrastructure while simultaneously instilling terror or advancing ideological agendas.

● Financial fraud refers to crimes committed online, such as credit card theft, identity theft, and Ponzi schemes.

Legal framework for digital arrests in India:

India's judicial system has steadily evolved to deal with digital crimes. The main laws and frameworks that govern digital arrests include:

1. The Information Technology Act (2000) serves as the cornerstone of India's digital legal structure. This legislation covers numerous cyber offenses, ranging from system intrusions and identity fraud to prohibited online material dissemination. It empowers authorities to examine, detain, and legally pursue cybercriminals.

Key provisions include:

- Section 66: Prohibits unauthorized system access and information theft
- Section 67: Regulates obscene digital content distribution
- Section 69: Grants government interception rights for national security threats or cyberterrorism investigations

.**2. BNSS(2023)** It establishes criteria for arrests, searches, and seizures, which are also applicable in cases involving digital evidence. During criminal inquiries, authorities can seize digital equipment, block financial accounts, or suspend access to online profiles.

3. DPDP ACT 2023: This proposed measure will tighten privacy safeguards and specify how personal data may be acquired, utilised, and processed in India. It will also specify penalties for data breaches and unauthorised access to personal information.

The government takes proactive measures

1. Indian authorities have implemented robust measures to combat virtual detentions and enhance citizen protection. By December 10, 2024, IC4 had blocked more than 1700 Skype identifiers and 59,000 WhatsApp profiles.

2. Multiple awareness initiatives and official advisories have been issued to educate citizens about fraudsters impersonating officials to extort money through fake digital arrests.

3. A collaborative framework with telecommunications companies now filters spoofed international calls displaying local numbers. Approximately 669,000 mobile connections and 132,000 device identifiers were deactivated by mid-November 2024.

Gaps in Current Legislation:

1. Lack of Specific Legislation. While multiple initiatives aim to enhance the process for handling digital arrests systematically, India's current legal system lacks explicit provisions for such measures. This legal void obstructs efficient cybercrime prevention. Resolving this necessitates statutory amendments to officially recognize virtual detentions, enhance procedural protections for digital offense suspects, and require specialized cyber investigation training for police to improve cross-departmental cooperation. Such updates are essential to modernize the judiciary for digital-era challenges and safeguard citizens against evolving threats.
2. Cross-border cooperation:- The cross-border nature of virtual detentions presents major obstacles, as perpetrators frequently exploit legal gaps by operating from territories with weaker cyber laws. This reality demands strengthened international collaboration, including uniform procedures for data sharing and mutual legal assistance agreements, to ensure successful prosecution of transnational cybercriminals. Unified global efforts and synchronized measures are essential to align legal frameworks and enable swift, coordinated responses to digital offenses worldwide.

The rising incidence of fraudulent virtual detentions in India presents significant legal challenges. Existing statutory provisions, while providing basic safeguards, prove inadequate against the sophisticated cross-border operations of these scams. Addressing this growing threat demands a multifaceted strategy incorporating stronger laws, global collaboration, enhanced police capabilities, and citizen awareness programs. Legal reforms must be accompanied by comprehensive public education campaigns to improve digital literacy and help individuals identify and avoid such fraudulent schemes. With these crimes continuously adapting to technological advancements, all parties involved must maintain constant vigilance and adaptability to protect communities from these deceptive practices.

3.10 Conclusion:

Today, most individuals provide preference to the banking facilities available in the online form. One is required to sign up for the account, and that calls for having to input personal details, but the services are executed on the internet and thus raise the issue of cybercriminal activities. This can be prevented or reduced through several steps, and if one has become a victim of cybercrime, they can be provided legal aid. Nevertheless, the evolving cyber threat landscape demands constant vigilance and flexibility. Financial institutions should persistently allocate resources to advanced protective systems, enhance threat detection mechanisms, and promote security awareness among staff and clients. Effective cybercrime prevention requires coordinated efforts between banks, specialized cyber police units, regulators like RBI and CERT-In, and government bodies.

The increasing complexity of attacks, particularly those leveraging artificial intelligence and innovative scams like "digital arrests," underscores the necessity for legal system enhancements. This may involve enacting new laws or amending existing ones to confront modern cyber risks and explicitly define the legal status of "digital arrests" and similar deceptive practices.

Chapter 4: Judicial notions and legal mechanisms in the banking sector

4.1 Introduction

In a world where clients primarily deal with banks digitally and contact them rarely, "digital trust" has quickly emerged as a key differentiator of the customer experience. Banks that provide a quick, safe, and easy-to-use digital interface will experience an increase in income; those that don't risk losing customers and losing value. Modern banking necessitates quicker risk assessments (such as real-time payments), thus banks need to find the ideal balance between promptly processing approved transactions and combating fraud. The analysis begins by exploring landmark judicial decisions that have shaped cybercrime jurisprudence, including cases involving data breaches, online banking fraud, and cryptocurrency-related financial crimes. It scrutinizes how courts interpret concepts of liability, negligence, and evidence in digital contexts, particularly in disputes between banks and customers. The chapter then evaluates the efficacy of specialized legal mechanisms such as cyber courts, electronic evidence protocols, and expedited dispute resolution processes designed specifically for financial cybercrimes.

4.2 The new cybersecurity measures announced by the RBI [41]:-

The Reserve Bank of India has rolled out several programs to bolster cybersecurity in banking and digital transactions. Major actions include expanding Additional Factor of Authentication (AFA) mandates to cross-border online payments and establishing specialized web domains ('bank.in' for banks and 'fin.in' for NBFCs) to strengthen digital security protocols.

AFA serves as a secondary security layer mandating user identity verification before transaction authorization, typically through One-Time Password (OTP) validation. Although currently mandatory for domestic digital payments, the RBI now requires AFA for cross-border e-commerce transactions. This expansion ensures international card payments from India maintain equivalent security standards as domestic ones, significantly reducing fraud potential. Starting April 2025, the 'bank.in' domain will help customers authenticate legitimate banking websites, combating phishing scams. The complementary 'fin.in' domain for non-banking financial entities will similarly enhance platform credibility and security. Acknowledging financial organizations as primary cyberattack victims, the RBI enforces ongoing enhancement

[41] https://bfsi.economictimes.indiatimes.com/news/policy/explainer-what-are-the-new-bank-cybersecurity-measures-announced-by-rbi-governor-sanjay-malhotra/118029610#:~:text=By%20implementing%20stricter%20authentication%20standards%2C%20exclusive%20banking%20domains%2C,system%20remains%20secure%20and%20trustworthy%20for%20all%20users.

of protective and monitoring security systems. Regulated entities must implement comprehensive incident management procedures, backup solutions, and periodic vulnerability assessments to maintain uninterrupted operations during cyber incidents.

The Reserve Bank of India (RBI) plays a pivotal role in shaping cybersecurity regulations for India's banking industry. Although the RBI hasn't established a unified "cyber law," it issues detailed guidelines, directives, and frameworks that banks and regulated institutions must adhere to. These regulations derive authority from the Banking Regulation Act (1949), Reserve Bank of India Act (1934), and Payment and Settlement Systems Act (2007).

Here's an overview of the RBI's approach to cyber laws and regulations for banks:

1. Comprehensive Cybersecurity Framework:

   In 2016, the RBI developed a thorough "Cyber Security Framework in Banks" that outlines a structured method for banks to combat cyber risks. The framework emphasises:

   Board-Approved Cybersecurity Policy: Banks are required to have a well-defined cybersecurity policy that details their plan for combating cyber attacks, taking into account the complexity of their operations and acceptable risk levels. This policy should be unique from other IT or IS security policies. Cybersecurity Governance: The framework emphasises the role of the Board and senior management in overseeing and guiding cybersecurity initiatives.
2. Cybersecurity Incident Management: Banks must have comprehensive procedures in place to detect, respond to, contain, and recover from cyber incidents. This includes developing cyber crisis management plans. Banks must undertake continuous surveillance and real-time analysis of their systems in order to discover and respond to threats quickly.
3. Protection of Customer Information: Banks are held accountable for safeguarding the security and confidentiality of customer data, regardless of where it is stored.
4. Central Security Operations Centre (C-SOC): The framework encourages banks to develop and operate a C-SOC for proactive monitoring, threat detection, and incident response.
5. Baseline Security Controls: The RBI specifies various baseline security controls that banks must implement, including IT asset management, prevention of unauthorised software execution, secure configuration, network security, application security, patch and vulnerability management, user access control, data leak prevention, and management of removable media.

6. Advanced Threat Defence: Banks are expected to install advanced real-time threat detection and management systems, such as anti-phishing protection and secure web gateways.

   Vulnerability Assessment and Penetration Testing (VAPT): Regular VAPT exercises are required to discover and address problems in banks' systems.
7. Vendor Risk Management Third-Party Security Oversight: Financial institutions are required to monitor and mitigate digital security threats originating from external service providers and outsourced operations.
8. Cybersecurity Awareness and Training: Banks must conduct regular cybersecurity awareness seminars for their employees and educate customers about safe banking practices.
9. Reporting Cyber occurrences: Banks must promptly disclose severe cyber occurrences to the RBI and CERT-In (Indian Computer Emergency Response Team).

   It is vital to note:

   The RBI's rules are mandatory for scheduled commercial banks (except Regional Rural Banks), and they are frequently extended to other regulated organisations such as Urban Cooperative Banks and Non-Banking Financial Companies (NBFCs) with the necessary changes. The RBI takes a proactive approach to cybersecurity, routinely revising its standards to reflect the changing threat landscape. Adherence to the RBI's cybersecurity guidelines is essential for financial institutions to safeguard the banking sector's stability, ensure client protection, and prevent compliance-related sanctions.

4.3

OMBUDSMAN and cybercrime protection:-The Reserve Bank of India (RBI) has launched an integrated Ombudsman Scheme in 2021 to address bank customers' complaints about service problems. While the plan is primarily concerned with resolving complaints about traditional banking services, it also indirectly contributes to cybersecurity protection by addressing issues raised by digital banking and cybercrime. Role of the Ombudsman Scheme: Addresses Deficiency in Service: The system includes a wide range of banking services, including ATM/debit card operations, credit card operations, and electronic transactions. If a consumer experiences unauthorised transactions, data breaches owing to bank negligence, or failure to follow the RBI's cybersecurity rules, they can register a complaint with the Ombudsman.

Awareness and Education: The RBI and Ombudsman offices run awareness campaigns to educate customers about cyber fraud and the safeguards to take when making digital

transactions. This helps to prevent cyber mishaps. For example, the RBI Ombudsman in Jammu organised an awareness programme in October 2024 to teach people about cyber fraud and the grievance redressal methods available.The Ombudsman provides a free and efficient grievance redressal method. If a bank fails to respond to a client's complaint about cyber fraud or data security within 30 days, or if the consumer is dissatisfied with the bank's response, the customer may escalate the matter to the Ombudsman. Promotes Bank Accountability: The Ombudsman scheme pushes banks to improve their cybersecurity safeguards and respond more efficiently to client concerns about cyber issues. The fact that customers have redress for unresolved issues encourages banks to handle these situations seriously.

Role of the Ombudsman in Cybercrime Prevention:

1. The Ombudsman's major duty is to provide a free, fast, and fair mechanism for resolving customer complaints against banks. This comprises grievances that come from: Unauthorized/Fraudulent Transactions: If a consumer suffers a financial loss as a result of an unauthorised online transaction, phishing, or other cyber fraud, when the bank's lack of service is obvious, they may submit a complaint with the Ombudsman. Non-compliance with the RBI's Security rules: If a bank fails to follow the RBI's cybersecurity rules, resulting in a client loss due to cybercrime, the Ombudsman can investigate such complaints.
2. Investigating Complaints: The Ombudsman conducts impartial investigations into complaints submitted, obtaining evidence from both the customer and the bank. This method assists in evaluating the legitimacy of the customer's claim and finding any negligence or fault in service on the side of the bank.
3. Issuing Awards: If the Ombudsman determines that the bank was lacking in its services, which resulted in the customer's loss due to cyber fraud, the Ombudsman may issue an award directing the bank to compensate the consumer for the financial loss sustained.
4. Systemic Improvements: In addition to addressing individual complaints, the Ombudsman's office learns about recurring concerns and systemic vulnerabilities in the financial system that affect cyber security. This could lead to recommendations to the RBI for policy changes and enhancements to the broader cybersecurity framework for banks.
5. Awareness and Education: By emphasising examples of cyber fraud and the need of secure banking procedures in its decisions and pronouncements, the Ombudsman indirectly helps to raise customer awareness of cyber hazards.

In summary, while the Ombudsman is not directly involved in investigating cybercrimes (which is the responsibility of law enforcement agencies), it does provide a critical avenue for customers to seek redress from banks for financial losses caused by cyber fraud, particularly when there is a deficiency in the bank's services or compliance with RBI guidelines. The Ombudsman serves as an important layer of protection for bank consumers in the increasingly difficult terrain of cybercrime.

4.4 Case laws:-

2018 Pune's Cosmos Bank Cyber attack[42]

In August 2018 the biggest heist planned was conducted on the Cosmos Bank branch in Pune that led to fraud $13.92 million embezzlement. Cyber criminals got into Cosmos Bank's software system, stole the cash, and transfer it to a bank in Hong Kong. Another case of cyberattack was established through legal action where Cosmos Bank filed the cyberattack picture to the cuber division of Pune India. Hackers belonging to a group hacked the bank's ATM server and got away with data of many Visas or Rupay card holders. In the Cosmos Bank cyber-attack, the centralised financial system of the bank was not the chief aim. It was shown that the holders still had no changes in their bank accounts or the balance in the accounts and general statistics. The switching mechanism performs the function of being an interface between the unified banking system of the bank and the payment gateways.

The malware attack on the switching device contained numerous false notifications of various foreign Visa and Rupay debit card payment registrations. In two days, hackers breached ATMs located in 28 countries and withdrew Rs 78 crore; affected countries include Canada, Hong Kong, and some machines in India. An additional Rs 2. New methods of scams and instances such as the theft of 5 crore from ATMs in the Indian region were evident. Thus, 28,000 people made over 14,000 transactions for the 450+ cards in total in 28 countries.

4.5 Cyber-attack on Union Bank of India 2017[43]

A major July 2017 cyber intrusion targeting India's ATM infrastructure highlighted critical digital security weaknesses. The attack focused on Union Bank of India, among the country's leading financial organizations. Hackers gained access when an employee opened a deceptive email attachment posing as RBI communication. This infected document installed malware

[42] https://medium.com/@20dcs071/case-study-2018-punes-cosmos-bank-cyber-attack
[43] https://ambimat.com/cyber-attacks-in-india/

that harvested the bank's SWIFT authorization codes. Criminals then tried moving $170 million to a Union Bank account at Citigroup's New York facility, though the bank successfully intercepted these illegal transfers. While SWIFT confirmed several institutions compromises after the Bangladesh incident, it avoided directly identifying Union Bank. SWIFT representatives have continued dialogue with Union Bank's Chairman Arun Tiwari post-attack, according to Journal reports.

4.6 RBI phishing scam [44]

Cyber attackers executed a bold phishing campaign that even attempted to deceive the Reserve Bank of India. The scam emails, crafted to resemble genuine RBI correspondence, offered recipients a fake reward of Rs. 10 lakhs within two days for clicking on malicious hyperlinks. These counterfeit webpages precisely duplicated the central bank's official branding and web address structure. Unsuspecting victims were then prompted to disclose sensitive banking details, including account numbers, I-PINs, and passwords. In response, the RBI promptly issued an official alert on its website, cautioning the public about these counterfeit emails.

4.7 ATM Cyberattack 2018[45]

In mid-2018, criminals targeted Canara Bank by hijacking an ATM cash replenishment vehicle. Reports indicate hackers compromised over 300 accounts, stealing ₹20 lakh using skimming devices to extract card data from machines. The thieves conducted transactions ranging from ₹10,000 to ₹40,000 per account by cloning debit cards through these illicit devices. On August 5, 2018, Delhi police apprehended two individuals connected to an international card-skimming operation. Security Measures: Strengthening ATM surveillance and physical safeguards could prevent such data breaches.

4.8 Hacking of UIDAI Aadhaar Software [46]

2018 witnessed one of India's most significant data leaks when confidential medical records exposed one billion Aadhaar details. UIDAI's official breach disclosure revealed approximately 210 government-operated portals were compromised in this incident.The

[44] https://www.legalserviceindia.com/legal/article-7694-an-overview-of-cyber-crimes-in-banking-sector.html
[45] https://testbytessoftware.medium.com/major-cyber-attacks-on-india-2018-b83ef0bd2557

[46] https://www.mygreatlearning.com/blog/biggest-cyber-security-threats-indian-banking-sector/

Aadhaar system infiltration revealed sensitive information including PAN numbers, bank IFSC codes, and personal identifiers, with illicit vendors offering Aadhaar records for ₹500 via WhatsApp. Additionally, unauthorized Aadhaar reprints were being sold for roughly ₹300.

4.9 Scam of SIM Swap [47]

Four Navi Mumbai-based hackers in August 2018, fraudulently obtained SIM card detail and blocked the users to siphon off four crore rupees from their bank accounts. They employed the online banking to affect their transactions. Sophisticated cyberattacks and the collected statistics should act as a powerful message to the other financial sectors that are still vulnerable to cyberattacks.

Prevention: The data needed for this kind of method is obtained from several public domains and then utilised improperly. Reducing the likelihood that someone may obtain malicious stuff about by sharing personal information with unidentified applications and URLs. Fraudsters lure victims into engaging in fraudulent activities by using their information in a variety of scams. Therefore, it is advised to confirm the legitimacy of the website before entering any banking information or other personal information, as scammers utilise phoney websites to obtain information directly from potential victims.

4.10 The Case of the Bank NSP [48]

A female banking trainee, previously engaged to be married, exchanged numerous work emails with her fiancé using company computers. After their separation, she fabricated emails impersonating Indian bar associations that corresponded with the man's international clients, utilizing the bank's systems for this activity. The affected company subsequently filed a lawsuit against the bank, citing significant client attrition resulting from the incident. Since the emails were sent through the banks' server it was the banks' responsibility as ruled by the court. In the international environment, there is a requirement for cyber-controls or more accurately, the need for cyber-controls is on the rise; measures aimed at the encouragement of the cyber-laws to curb the menace of cybercrimes have become more important than ever. A large number of people experience infringements on their rights to privacy due to the fast-developing category of computer crimes. For the extermination of these offenses, it is now necessary to work out some effective cyber laws and further define and develop some leads. The most promising

[47] https://www.mygreatlearning.com/blog/biggest-cyber-security-threats-indian-banking-sector/
[48] https://www.legalserviceindia.com/legal/article-7694-an-overview-of-cyber-crimes-in-banking-sector.html

application of the Net can be considered electronic commerce, but this application cannot grow until such measures that will provide legislative support to it can be developed.

A study by a start-up supported by IIT Kanpur found that from January 2020 to June 2023, financial scams made up approximately 75% of cybercrimes in India.[49]

The Future Crime Research Foundation (FCRF), a non-profit startup based at IIT-Kanpur, recently published its comprehensive whitepaper 'A Deep Dive into Cybercrime Trends Impacting India'. According to FCRF's findings, online financial fraud constituted the predominant category at 77.41% of reported cybercrimes, with the organization noting this sector "represents a critical vulnerability encompassing deceptive practices in digital financial operations". The report further specified that "this classification incorporates credit/debit card scams, corporate email deception, internet banking fraud, along with the increasingly widespread UPI (Unified Payments Interface) fraud cases accounting for 47.25%".

4.12 Sumant Kumar @ Golu vs The State Of Bihar on 30 September 2022[50]

The inquiry is still ongoing. Co-accused Mantu Kumar mentioned all the petitioners; he was apprehended on the scene. The informant grabbed mobile sets, SIM cards, Debit Card, A.T.M Card, PAN Cards from the pocket of Track Suit of Mantu Kumar and also seized a bag that contained a Laptop, mobile sets, Bank passbook, and Adhar Card recovered that OPPO Mobile.According to Patna High Court CR. MISC. No. 50895 of 2021(4) dt.30-09-2022 and the FIR, numerous articles that demonstrate an organized cybercrime gang's involvement in cybercrime, bank fraud, and other crimes have been recovered from the petitioner Sumant Kumar @ Golu's home. The petitioners Sumant Kumar @ Golu, Shashi Kumar @ Shahi Mahto @ Babua, Pankaj Kumar @ Pankaj Kumar @ Tamoli, Raushan Kumar and Karu @ West Patna High Court CR. MISC. No. 50895 of 2021(4) dt. 30-09-2022 were all informed by co-accused Mantu Kumar to the police party. The Indiz dealer, who escaped the scene, was involved in other cybercrimes, including extorting money from individuals in order to improve their test scores for the Bihar School Examination Board. They utilised to defraud shopping centre patrons in addition to committing bank fraud. Office will make sure that any flaws are fixed by

[49] https://www.hindustantimes.com/business/financial-fraud-top-cyber-crime-in-india-upi-e-banking-most-targeted-study-101695036325725.html
[50] https://indiankanoon.org/doc/119243596/

the petitioners within the time frame stated above; if not, this Court will be notified of the situation.

4.13 Pallabh Bhowmick vs The Ombudsman on 30 September, 2022[51]

The case facts, as presented in the pleadings, reveal that the petitioner maintains a savings account with State Bank of India's Guwahati branch. After making an online purchase of Louis Philippe garments which he wished to return for a refund, the petitioner received a call from respondent no. 4, Papendra Kumar of Uttar Pradesh, later identified as the fraudster. Impersonating Louis Philippe's customer care manager (respondent no. 3), the scammer instructed the petitioner to download a mobile application to process a Rs. 4000 refund for the clothing purchase. Believing the call to be genuine, the petitioner installed the app, after which Rs. 94,204 was illegally transferred from his account via three online transactions. Initially, Rs. 64,017 was withdrawn through a payment gateway, followed by two subsequent transfers of Rs. 15,093 each. The stolen money was first deposited into a Federal Bank account before being redirected to other accounts.It was decided that the online transactions made on October 18, 2021, from the petitioner's bank account were fraudulent and unapproved. Respondent No. 2 was unable to prove the petitioner was negligent. As a result, the respondent No. 1's conclusion in its ruling of July 3, 2022, was illogical and could be overturned. This court further believes that the current matter will fall under the purview of clauses 8 and 9 in conjunction with clause 10 of the previously mentioned RBI Circular dated 06/07/2017. As a result, the petitioner will not be held accountable for anything.

4.14 Tinku Mandal vs The State Of Jharkhand on 30 June, 2017[52]

The financial and banking systems around the world are under threat from cybercrime and related offences. In the State of Jharkhand, a few areas have turned into hubs for cybercrimes and related banking offences carried out nationwide. A charge sheet has been prepared in the case after the petitioner was found guilty of the claimed primafacie charges.

Allegations have been made against the petitioner that he pretended to be a bank official and called various customers, obtaining their PIN and CVV numbers in order to take money illegally from their accounts. The written report, which served as the foundation for the filing of the First Information Report under Sections 419, 420, 467, 468, and 471 IPC and Section 66

[51] https://indiankanoon.org/doc/116159756/

[52] https://indiankanoon.org/doc/149938560/

(C) (D) of the Information Technology Act, disclosed not only the recovery of mobile phones from the petitioner but also the information gleaned from those phones that indicated multiple OTPs used for transactions and money withdrawals. Allegations have been made against the petitioner that he pretended to be a bank official and called various customers, obtaining their PIN and CVV numbers in order to take money illegally from their accounts.The financial and banking systems around the world are under threat from cybercrime and related offences. In the State of Jharkhand, a few areas have turned into hubs for cybercrimes and related banking offences carried out nationwide. Alleged prima facie offences have been proven against the petitioner.

4.15 Pune Citibank Mphasis Call Center Fraud 2005 [53]

Facts: The following year, of US$3,50,000 was transferred online using the victim-client's Citibank credit card account details that were cloned to a number of fictitious accounts by four real USA clients. Thus, under the idea that they would help them solve some tough issues, the staff gained the consumers' confidence and received the PINs. They were not hacking their ways through by breaking passwords or bypassing firewalls, instead they were probing for the system. .Conclusion: The Court pointed out that in this regard the defendants are mobilized ex-employees of the MphasiS contact centres. This is the case since employee entry and exit triggers an inspection of the checks. Therefore, it can be deduced that the staff members must have memorized the figures. SWIFT service or the Society for Worldwide Interbank Financial Telecommunication was used to transfer the amount. The actual mode of operation involved the unlawful exploitation of the clients' electronic accounts. Hence, this case falls under the label of 'cyber crime.' "Any offense amongst the IPC where the computer is used with producing or receiving any electronic record can be likened to crimes involving with the written documents since the IT Act is broad enough in including such types of crime.

4.16 UTI BANK 2017 [54]

In February 2017, UTI Bank's website fell victim to a phishing scheme that compromised its systems. Customers received fraudulent Geocities links via email, soliciting sensitive login information. Subsequent IT investigations revealed the site administrator as Petr Stastny, with his contact details displayed on the webpage. Senior UTI Bank executives confirmed reporting

[53] https://enhelion.com/blogs/2021/03/01/landmark-cyber-law-cases-in-india/

[54] https://www.legalserviceindia.com/legal/article-3073-cyber-frauds-in-the-indian-banking-industry.html

the incident to the Delhi Police's Monetary Office Wing. The institution additionally engaged Extortion Watch Worldwide, the Melbourne-based primary global monitor of phishing activities, to assist in the case.

4.17 BPO Fraud 2004

Another event involving MphasiS, India, involved four call centre workers who obtained PIN codes from four of the company's clients, Citigroup, despite not having the proper authorization to do so. Under false pretences, several accounts were formed in Indian banks, and in less than two months, they were able to move money from Citigroup customers' accounts to these accounts by using their PINs and other personal data. Although the cyber fraud case happened in December 2004, the Indian police were unable to identify the perpetrators and make an arrest until April 2005. A tip from a U.S. bank allowed it to happen when the accused attempted to take money out of these fictitious accounts. Just $230,000 of the $426,000 that was taken was found.

4.18 Poona Auto Anillaries pvt ltd Pune v. Punjab National Bank, 2011. [55]

It is the case of the prosecution that on August 23, 2011, rs 80,10,000 disappeared from the accounts of Poona Ancillaries Private Limited, PNB, Pune. Concisely, some of the companies mentioned include Idea Cellular, metropolis, Reliance Infocom and the managing director of the company Manmohan Singh Matharu had his account hacked. He discovered that forty transitions from his account to other unidentified people accounts rout totaling Rs 2 lac were made without his permission. Therefore, Matharu registered a police complaint and also reported the issue to the officials of Pune PNB. Based on the provisions of the IT Act 2000, he also filed a complaint at the official level to the state's IT Department.

4.19 State Bank of India vs Rajesh Agarwal on 27 March, 2023[56]

The lead bank in JLF consortium State Bank of India filed a civil appeal no. 7300 of 2022 before the apex court challenging the order of Telangana High Court. The main defence that has been placed by the SC is that the Banks' actions when they declined credit facilities classified the borrower or its directors as ineligible and blacklisted them which resulted into civil and criminal consequences. In addition, as the aforementioned action is administrative in nature, the Master Directions should incorporate the natural justice principles—audi alteram

[55] https://www.rlegalcareercoach.com/top-20-cyber-law-cases--must-be-aware-of/

[56] https://www.khaitanco.com/thought-leaderships/Supreme-Court-clarifies-that-a-borrower-must-be-given-a-hearing-before-classification-of-its-accounts-as-fraudulent-and-the-banks

partem, in particular. Therefore, natural justice as held by the Honourable Supreme Court was to be incorporated in the Master Directions.

4.20 Gurwinder Singh vs State Of Punjab And Another on 9 February, 2021

The petitioner in this case is accused of defrauding seven banks. There are also claims that several bank and government employees participated in the fraud. It must be acknowledged that the initial investigating officer in this case did not attempt to place the petitioner under arrest. The petitioner's father and brother are also accused of having taken out loans from many banks. The Superintendent of Police Investigation (Chairman SIT), Patiala, has submitted an additional status report that details the superficial investigation. It does not address pertinent details such as the purpose of the loan, its disbursement and utilisation, repayment history, type of documents executed, guarantor status, execution of the mortgage deed, and documents produced in support of the loan that involve fraud.

4.21 Federal Bank Ltd vs V.M Jog Engineering Ltd. And Ors on 29 September 2000[57]

Consequently, purchasers cannot secure injunctive relief against financial institutions regarding irrevocable bank guarantees or letters of credit due to seller contract breaches. When vendors submit documentation specified in these financial instruments and the transaction appears compliant with contractual terms, banks are obligated to honor payment demands. Pursuant to Article 43 of the Uniform Customs and Practice (UCP), banking institutions must process encashment requests upon verifying that presented documents match those stipulated in the guarantee or credit letter without any modifications.

4.22 Tirupati Buildings and Offices Pvt. vs Reserve Bank of India on 1 July, 2019

The RBI states that a bank must notify both the investigating authorities and the RBI if it suspects a particular account to be fraudulent. Other banks must become aware of a fraud as soon as one bank reports it. In this regard, the RBI notifies banks of Cautionary Advisories (CA), which include information about the borrowers and linked parties in question as well as the methodology of the claimed fraud. This allows banks to proceed with caution when interacting with the businesses or individuals included in the CA. With a few exceptions, the Central Fraud Registry (CFR), a web-enabled database of frauds reported by banks, took the place of Cautionary Advice in January 2016

[57] https://indiankanoon.org/doc/28176/

4.23 Ali Ibrahim vs The State of Kerala on 14 October, 2014[58]

The petitioner claims that some unidentified individuals who contacted him via phone, email, and other means have defrauded him out of roughly Rs. 68 lakhs. The petitioner gave the fraudulent individuals the money directly and transferred it through bank accounts after being convinced to do so by the individuals. The petitioner's trust was betrayed by convincing emails and websites under the pretence of involving foreign nationals, calling from and providing local and international phone numbers, showing the passport and other details of some foreigners, etc. The allegations in the Writ Petition reveal that the petitioner was first contacted by the alleged fraudsters via email. He was also lured into the transaction by promises of a large profit in a future business, and money was taken from him on multiple occasions, citing various justifications and excuses.

4.24 A Russian's hacking of a U.S. bank in 1994[59]

A band of international hackers from several continents including the United States of America, headed by a ng computer programmer of St. Petersburg, Russia, got to the virtual walls of a large bank in the USA twenty years ago and started pilferage money surreptitiously. This was bank robbery of the new generation, the shared world of the internet; no mask over the face, no threatening message, and of course no weapon. This case began in July 1994 when many of the corporate bank clients complained that the sum of $400 000 was missing from all their accounts. The problem was immediately reported to the FBI by the bank personnel as soon as they learnt of its existence. With the specific target of business clients of the institution, its cash management computer system, which allowed passing of money from their accounts in other Banks all across the globe, seems to have been the most attacked. With the help of the communications network and obtaining legal user IDs and passwords of the site, the crooks in question were able to get into it. The virtual theft, which occurred in August 1994, and subsequent investigation of what is described to be the first Internet bank robbery, such as it was, became a critical wake-up call for both the police and the financial services sector and its security providers. The corrective action that was made by the victim bank was to strengthen up the security in the network. The Web security specialists got to know of the problem from media coverage though the breach did not touch the Internet. To its credit, the FBI began the process of extending its investigations abroad, and in the realm of cybercrime. It has also over

[58] https://indiankanoon.org/doc/72673147/
[59] https://www.fbi.gov/news/stories/a-byte-out-of-history-10-million-hack

the years acquired a portfolio of methods and instruments which it uses to head investigations into high-tech crimes within the nation.

4.25 International money launderer, 2021[60]

A Canadian national received an extensive 140-month federal prison sentence for conspiring to launder millions obtained through multiple financial fraud operations, including thefts orchestrated by North Korean cybercriminals. U.S. Attorney David H. Estes of the Southern District of Georgia confirmed that Ghaleb Alaumary, 36, from Mississauga, Ontario, was found guilty on two charges of money laundering conspiracy. U.S. District Judge R. Stan Baker additionally mandated three years of supervised probation following incarceration and ordered $30,703,946.56 in victim restitution payments. The federal penal system does not permit parole eligibility.

4.26 R v. Thompson[61]

In the case of R v. Thompson, the appellant originating from Kuwait had deceived a bank to transfer certain amounts in particular bank accounts in England. It was granted, but it was used in a restricted manner; for a prohibited kind of access. It was as expected, the 1968 Theft Act was wanted. The main issues of debate were victims' identification and their legal demarcation between Kuwait and England. The court, therefore, held that the identification of a human victim is mandatory before one could be charged under the Theft Act. But in this case, it was not the human mind that has been deceived, in fact what has been deceived was the computer system. This proved how unsuitable the existing system of justice was to address such scenarios where a computer was on the receiving end as a result of criminal acts perpetrated by others.

4.27 Bangladesh Heist, 2016 [62]

The Bangladesh Bank's reserves were stolen for $101 million, demonstrating the susceptibility of financial institutions to cybercrime syndicates. The efficacy of current methods in averting such accidents is called into question by this episode. Moreover, this cyber theft underscores the crucial necessity for strengthened international collaboration against digital financial crimes. In February 2016, cybercriminals who had obtained Bangladesh's central bank authorization codes submitted $1 billion worth of transfer orders to the Federal Reserve Bank of New York. The perpetrators attempted to move Bangladesh's reserve funds to accounts in

[60] https://www.justice.gov/usao-sdga/pr/international-money-launderer-sentenced-federal-prison-cyber-crime-conspiracies

[61] https://enhelion.com/blogs/2022/06/22/development-of-cybercrime-law-in-the-united-kingdom/

[62] https://www.bbc.com/news/stories-57520169

the Philippines. However, a spelling error in the Sri Lankan charitable organization's designation alerted intermediary financial institutions, causing the complete termination of the fraudulent transfers. The hackers had inaccurately written the beneficiary institution's name. Many people in Bangladesh and elsewhere were shocked to learn that such a substantial sum had been stolen from national reserves. There are concerns raised over the nation's ability to safeguard its digitally transforming financial infrastructure. The prevailing Awami League government, which is implementing a "Digital Bangladesh Programme" to digitize several branches of the government, is now greatly embarrassed by the heist.

4.28 Cyberattack in China's ICBC, 2023[63]

Market participants have raised questions on the vulnerability of other mainland lenders to ransomware attacks as demonstrated by the ICBC break in, the largest bank globally by assets. Nov. 8 a New York unit of the Industrial and Commercial Bank of China Ltd had to pull out of the U. S. Treasury market after a ransomeware attack. The hackers demanded to be paid before they could allow access to a system and data, claiming they will shut down access. But when the bank will establish will the link it is not known. In light of a ransomware attack that ICBC experienced on November, eight; the organization pulled one of its units out of the US Treasury market.

[63] https://asia.nikkei.com/Business/Technology/China-s-banks-seen-as-vulnerable-after-ransomware-attack-on-ICBC

Chapter 5

5.1Conclusion

The hacking incident had an impact on the bank's whole operations and raised concerns about the consistency of its procedures. A reputational risk was evident in the rush on deposits totalling about Rs. 1000 crores. The bank used a number of change management strategies to oversee the turnaround. In order to allay customers' fears, the bank management was able to mobilize the entire workforce and create a sense of urgency. They also devised a plan that included technological solutions, investigation, and various balance sheet exercises in addition to reputation restoration and technological restoration in order to restore profitability and confidence, all of which helped to attract new business. Although it was a very tough and demanding effort, the bank was able to improve its reputation by growing business, therefore the year under review may be considered positive and productive. The rapid digitization of India's banking sector, driven by initiatives like Digital India and UPI, has revolutionized financial transactions, making banking more accessible and efficient. However, this transformation has also exposed the sector to escalating cyber threats, including phishing, UPI frauds, malware attacks, and data breaches. Cybercriminals are leveraging advanced technologies such as AI, social engineering, and ransomware to exploit vulnerabilities in digital banking systems, leading to significant financial losses and erosion of customer trust.

India has made notable progress in combating cybercrime in banking through legislative measures like the IT Act (2000 & 2008), RBI's cybersecurity guidelines, and the Digital Personal Data Protection Act (2023). Institutions like the Indian Cyber Crime Coordination Centre (I4C) and CERT-In play crucial roles in monitoring and mitigating cyber threats. However, challenges persist, including underreporting of fraud, jurisdictional complexities, and the rapid evolution of cyberattack techniques.

5.2 Suggestions

Institutions must have a multi-layered cybersecurity plan that incorporates cutting-edge technology, stringent regulatory compliance, and ongoing education to successfully combat cybercrime in the banking industry. Vulnerabilities can be greatly decreased by putting strong security measures in place, such as multi-factor authentication, end-to-end encryption, and AI-powered fraud detection systems. To stop phishing and social engineering assaults, regular employee training and customer awareness initiatives are crucial. In order to exchange threat intelligence and react swiftly to new threats, banks should also work with law enforcement and

other financial institutions. Banks can reduce the risk of cybercrime by establishing a safe environment through the integration of technology with proactive policies and awareness.

To effectively eliminate cybercrime in banking, a comprehensive and multi-faceted approach must be implemented. Financial institutions should prioritize building robust cybersecurity infrastructures incorporating artificial intelligence and machine learning for real-time fraud detection, blockchain technology for secure transactions, and Zero Trust Architecture to minimize unauthorized access. Governments and regulatory bodies must strengthen legal frameworks by introducing stricter cyber laws with severe penalties, establishing specialized cyber courts for swift justice, and mandating immediate breach reporting protocols. Simultaneously, banks need to invest significantly in customer education through regular cybersecurity awareness programs and real-time fraud alerts to empower users against social engineering attacks. On an international level, enhanced cooperation through global cybercrime task forces, shared threat intelligence systems, and standardized cybersecurity protocols across jurisdictions is crucial to combat cross-border financial crimes. Financial institutions must also conduct frequent security audits, implement advanced employee training programs, and secure their API and cloud-based systems against evolving threats. Looking ahead, banks should proactively adopt quantum-resistant encryption and behavioral biometrics to future-proof their systems against emerging risks. While complete elimination of cybercrime may not be immediately achievable, the synergistic implementation of these technological, legal, educational, and collaborative measures can create a substantially more secure banking ecosystem that stays ahead of cybercriminals and protects both financial institutions and their customers from sophisticated digital threats.

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CYBERCRIME AS AN EMERGING MENACE IN THE BANKING SECTOR, THE ISSUES AND CHALLENGES WITH SPECIAL REFERENCE TO INDIA.

Chapter 1: Introduction

1.1 Introduction

The banking industry in India has rapidly changed in the current, more digitalised economy, adopting fintech technologies, online payments, and mobile banking. Although this development has increased efficiency and convenience, it has also made the industry more vulnerable to serious cyberthreats.The frequency of cybercrimes targeting banks has risen significantly, ranging from ransomware and phishing attacks to large-scale data breaches and financial fraud. India, among the fastest-growing digital economies, faces heightened vulnerability due to its surge in new internet users and an evolving cybersecurity infrastructure.

The importance of banks in preserving both public trust and economic stability makes research on cybercrime in Indian banks necessary. Sensitive financial and personal information is held by financial institutions, and any compromise could result in significant financial loss, harm to the institutions' reputation, and a drop in consumer trust. Furthermore, there is an urgent need for strong frameworks to identify, stop, and effectively respond to such attacks as hackers use ever-more-advanced tactics. Policymakers, financial institutions, and cybersecurity specialists may tighten regulatory frameworks, increase consumer digital literacy, and create more resilient systems with the aid of a targeted study on cybercrime in the banking sector. To understand the trends, techniques, and offenders involved in cybercrime, it is essential to examine it within this framework. This analysis helps evaluate existing security protocols, identify vulnerabilities in digital systems, and assess the readiness of financial institutions to counter such threats. Additionally, the study supports the formulation of robust cybersecurity regulations, laws, and policies tailored to the banking sector.

The Digital Personal Data Protection (DPDP) Act, 2023, along with the Bharatiya Nyaya Sanhita (BNS) and Bharatiya Nagarik Suraksha Sanhita (BNSS) amendments to criminal and procedural laws, reflects a major shift in India's strategy to tackle cybercrime. The DPDP Act specifically regulates the handling and safeguarding of personal data, a critical aspect of banking activities. Meanwhile, the BNS and BNSS redefine offenses and establish procedures to prosecute cybercrimes more effectively. Cybercrime in the banking industry affects national security and economic stability in addition to being a business issue. Large-scale cyberattacks have the potential to disrupt services, destabilise markets, and even aid in the financing of terrorists and money laundering because banks are essential infrastructure. The formulation of national cybersecurity plans can be guided by a comprehensive understanding of how cyber dangers can interact with wider economic and security objectives, which is made possible by studying cybercrime.

The growing digital footprint of the Indian banking industry, the sophistication of cyberthreats, customer ignorance gaps, and changing legislative frameworks make it necessary to research cybercrime in this sector. Strengthening cybersecurity procedures, influencing legislation, improving regulatory compliance, and eventually guaranteeing a safe and reliable financial environment all depend on this kind of study.

Proactive study and analysis of cybercrime in banking will be essential to protecting India's financial ecosystem as it moves closer to being a digitally empowered economy.

1.2 Cybercrime and its Relation with the banking sector[1]

This is true because the banking industry has not been left out in the rampant cases of cybercrimes. The RBI has given the meaning of bank fraud as; 'A misrepresentation or concealment of material facts, whether by omission or commission, committed consciously by any person in relation to banking business and the books of account maintained manually or under computer systems in banks leading to wrongful gain to any person for a temporary period or otherwise, with or without causing loss to the bank'.

E-banking

Electronic banking involves utilizing data and computer technologies to operate banking systems, eliminating the need for direct human involvement. Clients and banks do not engage in in-person interactions; instead, services and data are delivered via e-banking platforms using devices like PCs, mobile browsers, desktop applications, telephones, or smart TVs. Additional e-banking methods comprise ATMs, credit/debit cards, real-time gross settlement (RTGS), mobile commerce, and internet banking.

1.3 Categories of cybercrime occurring in the banking sector[2]:-

• Malware-based attacks: This proves that among all the internet threats affecting the electronic financial system, Malware-based attacks are the most threatening. Such forms of attacks generate damaging codes into the target systems. Indeed, one must state that, nowadays, the financial industry faces a frequent problem of malware attacks.

• ATM Manipulation: One of the ways to hack these types of machines is to fix a skimming device on the top of the ATM or point of sale system making it seem real or fix one on the card reader making it look like it is part of the engine.

• Phishing: "Phishing scams involve sending fraudulent emails disguised as legitimate organizations to trick recipients into revealing sensitive details like credit card numbers, debit card details, customer IDs, CVV codes, and other personal information."

[1] Concept of cybercrime in the banking sector, https://www.ezylegal.in/blogs/concept-of-cybercrime-in-the-banking-sector(oct 06/2024)

[2] Concept of cybercrime in the banking sector, https://www.ezylegal.in/blogs/concept-of-cybercrime-in-the-banking-sector(oct 06/2024)

• Pharmacy: It is the practice of employing the internet in deceiving clients into accessing a website that is identical to a bank. The attackers undertake this through a process of redirection of the URL of the respective bank's website.

• Spyware: It is the most common method of obtaining login details to banking accounts and subsequently conduct fraudulent activities.

• Viruses: It is a type of virus that replicates itself in papers or executable code in order to spread infection. A virus can be defined as a hardware or software element that infects an executable file and makes the sick file perform different or undesired tasks. Properly, it propagates through incorporation into the operating systems and executable files such as program files.

• Hacking: Cybercrime refers to illegal activities conducted through computer networks, with hacking being one such form. This occurs when an individual tries to bypass authorization codes, gain unauthorized entry into accounts or banking websites, or infiltrate restricted systems without permission..

• Logging keys: It is dubbed as the "keystore logging or keyboard capture". it is a technique of capturing what is typed on the keyboard such that the user himself or herself is not in a position to realize that their activities are being monitored. They pointed out that banking information and other sensitive information can be stolen by the dangerous approaches.

1.4 Reasons for cybercrime in banks.

1) Indeed, the advancement of computer technology is such that it becomes possible to penetrate a particular system at several places and ways implying that it becomes very difficult to protect such a system against intrusion. Malicious individuals and organizations can easily

Acquire access codes, capture retinal scans, employ high-quality voice recorders, and utilize devices capable of bypassing biometric security; these methods breach firewalls and can penetrate multiple protective barriers.

2) Able to contain information in a relatively rather limited extent, by this, it means that it can store the information in a small space. Individuals will be able to easily carry out unauthorized access of other storage systems to extract useful data and use it for their own benefit as will be seen.

3) Creating a computer is not an easy task: A computer with windows operating system is hundreds of thousands, if not millions, of lines of code. Incompetencies are bound to occur at any one time because man and his mind are excessively frail. This is an area that Cybercriminals could exploit. Explain reasons

1.5 Strategies for the protection of the banking sector

- Establishing stringent corporate policies that ensure secure data protection.
- Along with ensuring employee safety protocols, they are implementing necessary safeguards like password protection, user authentication, and login activity tracking.The sharing of protected information is prohibited and each employee is given their user.
- Limit the installation and download of any illegal software by employees.
- It guarantees that the proper approval processes are followed with a minimum of two approval requirements for operations such as wire transfers and clearing transfers.
- Increasing technical assistance will guarantee that every device has sufficient firewall defence. Any contacts from unauthorized websites will be blocked

How cyber law benefits the banking sector[3]: -

Because banking services have become widely digitalized, there is an unstated mutual benefit between the banking industry and cybercrime. Today 40% of all online banking transactions worldwide take place in India thanks to QR codes, UPI, and online banking payments. 1 page

The following are some crucial facets of the banking industry and cyber law

- **Data protection:** - To protect client data, banks and financial organizations must establish strong information security measures, such as data encryption, limited access controls, and periodic compliance audits, as required by cybersecurity laws.
- **Incident response strategies: -** Cyber law mandates that banks create incident response strategies, notify regulatory authorities of cyber events as soon as possible, and assist with investigations.
- **Protection of customers: -** Cyberlaw upholds laws about identifying theft, unauthorized transactions, and online banking crime, guaranteeing that clients are shielded from cybercrimes.
- **Legal framework: -** by guaranteeing the customer's digital transactions and data are protected by legislation, cyber law offers a legal basis for the digitalization of the banking industry.
- **Cyber Security Education and Awareness: -** cyberlaw advocates banks to provide frequent education sessions and inform staff members and clients on safe online conduct, potential security risks, and reporting guidelines.

1.6 Review of the literature:-

[3] Concept of cybercrime in the banking sector https://www.ezylegal.in/blogs/concept-of-cybercrime-in-the-banking-sector(09/2024)

Amlan Jyoti Baruah and Animesh Sarmahand (2017): Cybercrime, according to the authors of this article, is the term for illegal activity or crimes engaging the internet. The term "Cyber Law" was coined to deter or punish cybercriminals. According to the authors, the area of law that addresses the Internet, cyberspace, and legal matters is known as cyber law. Freedom of expression, Internet access and use, online security, and online privacy are just a few of the many secondary themes it covers.

According to **Anuraj Singh (2007),** India's cyber law requires such regulations so that consumers can use credit cards to make purchases online without worrying about fraud. To guarantee that electronic records maintain their legal validity and enforceability, the law establishes an appropriate regulatory framework. Cybercrime has become an inevitable, widespread phenomenon that intersects with multiple spheres of criminal behaviour. This digital environment, governed to ensure equitable access to information for all users, emerges from technological advancements and interconnected networks. The misuse of internet-enabled technologies has gradually led to the rise of cybercrime. Fundamentally, cybercrime constitutes illegal activities that lead to criminal consequences. Cybersecurity is a method for safeguarding data about computers and other devices from unlawful and unauthorised entry. This paper discusses and provides examples of cybercrime, its effects on society, the many kinds of threats, and cybersecurity. The issues of cybercrime and theft have grown more apparent in the modern era, especially those about identity theft, childcare, copyright infringement, piracy, and child pornography.[4]

Rao and Suvarchala (2018) focused on how consumers felt about banking services after demonetisation. The study revealed that customers face considerable challenges accessing banking services, and noted that post-demonetization, their perception of financial services has dramatically transformed. They also disclosed that the problem of non-performing assets (NPAs) is one of the major obstacles the Indian banking industry faces.[5]

Sujatha (2017) examined the evolution of e-banking services, customers' awareness of digital banking facilities before demonetization, and governmental efforts to promote cashless transactions. The study found that banks actively educated clients about digital payment systems pre-demonetization via training programs, awareness drives, and comparable activities. Following demonetization, internet banking users have become more apprehensive about data protection and privacy matters**. Alwan and Al-Zubi's (2016)** research emphasized how Jordanian commercial banks must prioritize security and privacy issues due to rising cyber threats. Since the internet functions as a worldwide system vulnerable to attacks and unauthorized access, financial organizations need strong security frameworks to protect sensitive customer

[4] Prof. Saquib Ahmad Khan, International Journal of Scientific & Engineering Research Volume 11, Issue 5, May-2020 691 ISSN 2229-5518

[5] Analysis of cyber-crime effects on the banking sector using thebalanced score card: a survey of literature,Oluwatoyin Esther Akinbowale,Heinz Eckart Klingelhöfer and Mulatu Fekadu Zerihu, Journal of Financial CrimeVol. 27 No. 3, 2020

data**. Alagarsamy and Wilson (2013)** noted that banking services are evolving to counter cyber threats while meeting clients' dynamic needs and preferences to maintain competitiveness. Customers expect high standards from banks, especially concerning safety, precision, and efficiency. Nevertheless, banks continuously adopt technological advancements and creative approaches to satisfy client demands and gain market advantage by expanding their reach, attracting new customers, and retaining existing ones.[6]

Kweyu and Ngare (2013) conducted research examining Kenyan users' attitudes toward mobile banking services. The study identified key adoption factors, including customer perceptions and mediating demographic variables, which might operate differently in emerging economies compared to developed nations. Findings also revealed no gender-based variations in preferences concerning online banking's perceived convenience and associated risks..[7]

Furthermore, Research conducted by **Malik et al. (2018)** revealed that cybercrimes negatively affected both the performance and trustworthiness of Pakistani financial institutions. The results further indicate that regulatory measures somewhat reduce cybercrime consequences. Nevertheless, the study was unable to pinpoint exactly which aspect of bank operations in Pakistan suffered most from cyber threats.

Ali et al. (2017) investigated the impact of cyber risks on customer perceptions of digital banking and revealed that merely 31% of participants recognized the specific cyber threat types listed in their study. This indicates that approximately 70% of online banking users lacked awareness of these dangers. The knowledge gap likely stems from inadequate education and limited understanding across all customer segments. Fraudsters exploit this vulnerability to harvest personal data from unsuspecting users for illegal activities.

Tariq (2018) analysed cyberattack cases across five continents to assess their impact on banking institutions. The findings revealed that cyberattack-related damages fall into two distinct classifications: immediate financial losses and secondary consequences. Direct impacts include fund theft and information leaks, while indirect effects encompass client dissatisfaction and reputational harm. However, the research proposed mitigation strategies to combat cyber threats in banks, comprising rigorous internal controls, security audits, risk evaluations, and staff awareness programs**. Arcuri et al. (2017)** analysed the impact of data breaches and cyberattacks on corporate stock performance. The study revealed that financial institutions experience more severe consequences than other organizations, with substantial negative

[6] Analysis of cyber-crime effects on the banking sector using thebalanced score card: a survey of literature,Oluwatoyin Esther Akinbowale,Heinz Eckart Klingelhöfer and Mulatu Fekadu Zerihu, Journal of Financial CrimeVol. 27 No. 3, 2020

[7] Analysis of cyber-crime effects on the banking sector using thebalanced score card: a survey of literature,Oluwatoyin Esther Akinbowale,Heinz Eckart Klingelhöfer and Mulatu Fekadu Zerihu, Journal of Financial CrimeVol. 27 No. 3, 2020

market reactions following cybersecurity incident disclosures. Additionally, the research found that public, non-confidential cyber incidents prove most damaging, especially for the financial sector.

Balan et al. (2017) further stressed that enhancing internal controls is essential to avoid security deficiencies. They noted that some organisations have become immune to fraud because of the implementation of strong internal control measures; therefore, organisations will be able to combat cyber fraud more effectively and proactively if internal control measures are consolidated or reinforced.

Al-Suwaidi et al. (2018) examined factors influencing cybercrime by assessing attack rates in ten countries (Belgium, Canada, China, India, Italy, Japan, Spain, the Netherlands, the UAE, and the US) between 2005-2017. The study revealed that unemployment had no meaningful relationship with cyber offenses in Belgium, China, Italy, the US, or the UAE. These findings imply that the pattern may result from various nation-specific economic values and cultural attributes.

Kshetri (2015) asserts that the main economic and social features of India, such as its dual economy and low income and educational levels, are directly linked to the country's high unemployment rates and high significance level. These elements lead to reduced human development indicators, greater wealth disparity, and fragile democratic governance structures. Kumudha and Rajan (2018) performed an extensive analysis of cybersecurity issues.

Kumudha and Rajan's (2018) in-depth analysis of banking sector phishing impacts revealed that escalating cybercrime rates and complex investigation procedures demand appropriate preventive strategies.

Malik et al. (2018) found that cyber offenses negatively impact Pakistani financial institutions' operational effectiveness, with damage levels varying between 60-and 80%.

Malik and Islam (2019) explored how information security awareness helps combat cyber fraud, strengthens customer data safeguards, and improves operational productivity in Pakistan’s banking industry. The study indicates that cyber fraud has undermined both trust and functional efficiency in financial institutions. However, properly implemented awareness initiatives have successfully mitigated these negative effects.[8]

According to a 2018 UK Finance report, hackers infiltrated Bangladesh Bank's IT infrastructure, gaining unauthorized access to its payment platform connected to the SWIFT network. The perpetrators attempted 35 fraudulent transactions targeting fund transfers to Sri Lanka and the Philippines, but anti-fraud

[8] Analysis of cyber-crime effects on the banking sector using thebalanced score card: a survey of literature,Oluwatoyin Esther Akinbowale,Heinz Eckart Klingelhöfer and Mulatu Fekadu Zerihu, Journal of Financial CrimeVol. 27 No. 3, 2020

mechanisms successfully blocked 30 of these transactions. Over time, cybercriminals have employed diverse strategies targeting banks, such as phishing campaigns, identity spoofing, and unauthorized account access. These methods have enabled the unlawful acquisition of confidential information and security breaches within financial organizations.

Njeru and Gaitho's (2019) research revealed that 95% of participants recognized cybercrime as a major banking threat, with only 5% dissenting. Most respondents considered cybersecurity insurance costs for protecting customers and financial institutions against online risks prohibitively expensive, possibly limiting sector growth and technological advancement. The study additionally revealed that financial institutions incurred substantial fees to maintain IT regulatory compliance, with particularly elevated expenditures for prevention and detection systems, ultimately leading to diminished profit margins**.** Cybercrime, according to **Hunton (2009**, p. 532), is "a crime committed through the use of an electronic medium involving cyberspace." Cyber breaches include creative communications and fact-finding techniques that are carried out quickly and precisely and require significant forensic and investigative skills.

According to the **PwC (2018)** worldwide Report, which looked at cybercrime from a worldwide perspective, 48% of businesses that provide financial services are at risk of economic crime.The study further revealed South Africa ranked second among the top 15 countries for economic crime (70% incidence rate), with respondents concurring its law enforcement lacks adequate preparedness to combat cyber threats..[9]

The **KPMG (2019)** Global Banking Fraud Survey categorizes ten fraud varieties: scams, identity theft, impersonation, data breaches, internal fraud, cyber fraud, mortgage fraud, financial misrepresentation, rogue trading, and merchant fraud. The study, covering over 50% of respondents from America, EMA, and Asia-Pacific, revealed that cyber fraud constituted under 25% of total financial losses.

Studies by **Böhme and Moore (2012)**, **Arachchilage and Love (2014)**, and **Wada and Odulaja (2012)** demonstrate that technological advancements, while enabling financial institutions to gain a competitive edge through internet and ICT reliance, also create vulnerabilities for criminal exploitation. These innovations introduce security threats, including unauthorized access to confidential banking data. **Anderson et al. (2013)** empirically confirmed that global financial entities incur billions in losses annually from direct and indirect cyberattacks, underscoring the need for sustainable countermeasures. Additionally, **Ali et al. (2017)** projected that financial firms will remain prime cybercrime targets, with potentially devastating economic consequences over the coming decade.

[9] Analysis of cyber-crime effects on the banking sector using thebalanced score card: a survey of literature,Oluwatoyin Esther Akinbowale,Heinz Eckart Klingelhöfer and Mulatu Fekadu Zerihu, Journal of Financial CrimeVol. 27 No. 3, 2020

Gady and Austin (2010) maintain that Africa's digital domain may serve as both a catastrophic weapon and an international security threat. A 2016 African Union Commission assessment recognized eleven nations - Botswana, Cameroon, Côte d'Ivoire, Ghana, Mauritania, Mauritius, Nigeria, Senegal, Tanzania, Uganda, and Zambia - as having established specific cybercrime legislation. Furthermore, twelve additional countries have partially adopted pertinent legal structures, with numerous others having draft cybercrime bills under legislative consideration.[10]

Initial studies on Indian cybercrime primarily centered on the Information Technology Act, 2000 (IT Act), the cornerstone of digital legislation. Although the IT Act covered various cyber offenses, including hacking, identity theft, and data breaches, authors like **Singh (2016) and Sharma (2019)** pointed out that it lacked comprehensive enforcement tools and flexibility to accommodate emerging forms of digital crime. Calls for revised legal frameworks that can address sophisticated crimes like deepfakes, AI-generated frauds, and widespread data exploitation were sparked by these constraints.

Scholars have started examining how the classification and prosecution of cyber offences have changed since the Bharatiya Nyaya Sanhita (BNS) replaced the Indian Penal Code (IPC). The BNS offers more explicit rules for crimes that are assisted by digital technology, such as electronic forgery, cyberstalking, and technological impersonation, according to recent legal assessments **(e.g., Rajan & Menon, 2024).** By acknowledging cyber-enabled offences as essential to contemporary criminal jurisprudence, the BNS seeks to close the legal gap and depart from the IPC's conventional, frequently analog-focused methodology.

Another significant procedural change is the Code of Criminal Procedure (CrPC) being replaced by the Bharatiya Nagarik Suraksha Sanhita (BNSS). Legal experts like **Iyer (2024) and Kumar (2023)** have noted that BNSS incorporates features for managing digital evidence and conducting investigations more quickly, both of which are essential in cybercrime cases. It improves the procedural robustness needed in cybercrime investigation and prosecution by introducing timelines for bringing charges, regulations for the admissibility of electronic evidence, and increasing the use of digital technologies in law enforcement.

The Digital Personal Data Protection (DPDP) Act, 2023, represents significant progress in cybercrime governance, especially concerning data privacy and obligations of data fiduciaries (including financial institutions). This legislation establishes a modern regulatory structure for data security, mandating explicit consent, limited data collection, and fiduciary accountability, according to academics like **Joshi (2023) and Banerjee (2024).** Additionally, it establishes sanctions for breaches and unlawful data processing, which have an immediate effect on how banks manage customer information. This regulation signals a move

[10] Analysis of cyber-crime effects on the banking sector using thebalanced score card: a survey of literature,Oluwatoyin Esther Akinbowale,Heinz Eckart Klingelhöfer and Mulatu Fekadu Zerihu, Journal of Financial CrimeVol. 27 No. 3, 2020

towards user-centric data governance by bringing Indian cyber law into compliance with international norms such as the GDPR.

1.7 Gap analysis

These are the gaps found**:-** Sophisticated machine learning and artificial intelligence threat detection systems.Minimising insider threats through the use of a zero-trust architecture.Improved incident response strategies with immediate mitigation and real-time monitoring.Blockchain technology integration for safe transactions.Expanded consumer education initiatives on preventing cybercrime.

The bank's defences against cyberattacks will be strengthened, financial and reputational risks will be decreased, and compliance with changing security standards will be enhanced if these holes are filled. Keeping up with cybercriminals requires constant investment in cybersecurity innovation.

1.8 Research problem

Rapid banking service digitisation has raised cyberthreats, resulting in data breaches, financial losses, and a decline in client trust. Banks still have to deal with sophisticated cyberattacks like ransomware, phishing, and insider threats despite security measures and regulatory frameworks. Finding weaknesses in the cybersecurity procedures in place and creating preventative measures to lessen risks are the difficult parts. The purpose of this study is to evaluate the efficacy of current security protocols, identify vulnerabilities in cyber resilience, and suggest creative ways to improve cybersecurity in the banking industry.

1.9 Justification for the study

The expanding dependence on digital banking has heightened financial organizations' vulnerability to cyber threats, leading to monetary damages, compromised client information, and reputational deterioration.. Banks continue to experience changing cyberattacks like ransomware, phishing, and insider fraud in spite of security frameworks in place, exposing weaknesses in current cybersecurity protocols.

This research is important since it will

- Find Security Gaps: This study will identify weaknesses that banks must fix by examining current cybersecurity measures.
- Boost Financial Security - Increasing banking cybersecurity will lower financial losses from cybercrime and boost confidence in online transactions.
- Support Regulatory Compliance: The study will shed light on how banks can better conform to industry best practices and changing laws, including NIST standards, GDPR, and PCI-DSS.
- Boost Customer Awareness: Having a better understanding of cyberthreats will aid in creating awareness campaigns that shield consumers from deception.

1.10 Research hypothesis

H1: Financial losses in banks are significantly impacted by cybercrime incidents.

H2: Banks are vulnerable to cyber assaults because their current cybersecurity procedures are inadequate.

H3 : The rise in internet penetration in India has led to an increase in cybercrime incidents.

1.11 Research Objectives

This research primarily aims to analyse cybercrime's impact on financial institutions and propose actionable measures to mitigate digital security risks. The particular goals are:

i) to identify which cyber threats - including ransomware attacks, phishing schemes, identity theft cases, and internal fraud - most significantly affect financial institutions.

ii) to evaluate the efficacy of the cybersecurity safeguards that banks have put in place to safeguard client information and financial assets.

iii) to assess how cybercrime affects monetary losses, banking institution consumer trust, and operational effectiveness.

iv) to evaluate how compliance standards and regulatory frameworks (such as GDPR, PCI-DSS, and NIST) help to reduce cyber threats in the banking industry.

v) to investigate cutting-edge cybersecurity tactics and technology including blockchain, artificial intelligence, and zero-trust architecture in order to stop cybercrime.

1.12 Research questions

1. What cybersecurity threats have impacted the banking sector?
2. What are the main legal mechanisms available to cope up with the issues?
3. What are the specific judicial notions dealing with such issues?
4. What steps should be taken to improve the position?
5. What are the loopholes in Indian legal system which is affecting the customers rights in combating cybercrime?

1.13 Research Methodology: Doctrinal methodology

The doctrinal approach, often termed the "black letter" method, represents the conventional form of legal investigation. This research technique focuses primarily on legislation, judicial precedents, and similar authoritative legal materials. Unlike alternative methodologies, the purely doctrinal perspective treats law as a codified system of principles that can be examined exclusively through legal texts, without evaluating the law's practical effects or implementation. Employing doctrinal research methodology, this study rigorously evaluates judicial precedents, statutory provisions, and jurisprudential principles concerning cyber offenses in financial institutions. The research focuses on examining existing legislation, regulations, and judicial decisions to identify gaps and propose improvements in legal approaches to combat cyber threats in banking.

Primary Sources:

●International and national banking laws (such as the Cybersecurity Act, GDPR, PCI-DSS, and NIST).
●rules about banking and cybercrime (such as the Financial Services Regulations, the Computer Misuse Act, and anti-money laundering laws).
●Court rulings and case law of cybercrime in banking.

Secondary Sources:

●Books, research papers, and journal articles about financial regulations and cybersecurity laws.
●reports from oversight organisations such cybersecurity agencies, financial institutions, and central banks.
●Whitepapers and government publications about cybersecurity rules and threats in banking.

1.14 Limitation of the research

●Statutes, case law, academic publications, and legal documents serve as the foundation for this research. It might not include firsthand accounts from banking professionals, cybersecurity specialists, or victims of cybercrime because it does not entail the collecting of actual data.

●Laws pertaining to cybercrime range from one nation to another, and legal frameworks might not be generally applicable. The study's generalisability to other areas with distinct regulatory regimes may be limited by its concentration on certain jurisdictions.

●Since cyberthreats are always changing, legal frameworks may find it difficult to keep up with more complex cyberattacks. The most recent changes to cybersecurity rules and regulations might not be covered by this study.

1.15 Chapterisation:-

Chapter 1: Introduction

The opening chapter provides a concise overview of cybercrime, e-banking, and the connection between cybercrime and the banking industry, along with various classifications of cybercrime. It includes a literature review referencing the BNS and DPDP Act 2023, while also outlining the research objectives, questions, and methodological approach. Additionally, this section justifies the study's relevance and identifies the existing research gap.

Chapter 2: An analysis of Cybercrime in the banking sector in the International scenario.

The second chapter discusses international treaties, conventions, and cyber laws in various countries, including BRICS and OECD members. It highlights key perspectives from different nations to provide an understanding of cybercrime's impact on the banking sector.

Chapter 3: Analysis of Cybercrime in the banking sector and it's legal provisions in India.

The third chapter examines the legal framework in India, including the IT Act 2000, BNS 2023, and DPDP Act 2023, while focusing on cybercrime's implications for the banking sector.

Chapter 4: Judicial notions and legal mechanisms regarding cybercrime in the banking sector.

This chapter discusses relevant case laws pertaining to cybercrime in banking and outlines cybersecurity initiatives implemented by the RBI. It also explains the ombudsman's function in addressing cybercrime-related issues.

Chapter 5: Conclusion and suggestions.

This chapter presents concluding observations and recommendations for preventing cybercrime within the banking sector.

1.16 Conclusions

This study provides an overview of cybercrime's impact on the banking sector while examining relevant case laws. The Indian Financial System primarily contains a banking system as a core of its financial structure. There is a need to curb cybercrime by the government of India, making sure that wherever a person is involved in any type of banking transaction through the electronic mode, that person shall not be a loser financially. There is currently an increase in the rate of cybercrime and the process of investigation implies certain procedures.

Chapter 2: An analysis of Cybercrime in the banking sector in the International scenario

2.1 Introduction:

The banking industry remains at the forefront of cybersecurity development due to its traditionally cautious risk management approach, consistent heavy investments in security infrastructure, and long-standing collaborative efforts at both institutional and regulatory levels. As a result, financial institutions continue allocating significant resources to combat the evolving, sophisticated cyber threats from global organized crime networks. Simultaneously, banks across the US, Europe and Asia encounter growing challenges in complying with an expanding web of national, regional and local cybersecurity regulations that often impose burdensome requirements. The accelerated adoption of emerging digital technologies including blockchain, cloud services and IoT has simultaneously introduced new security gaps in both consumer and enterprise systems that malicious actors increasingly exploit. Current estimates place worldwide cybercrime losses exceeding $7 trillion USD, with projections indicating steep escalation in coming years. Global IoT malware infections recently surpassed 100 million incidents, while the Asia-Pacific region has emerged as a prime target for cybercriminals due to its rapid digital transformation and widespread adoption of cutting-edge technologies.

Recent Cybersecurity Incidents involving Bank of America:

Between December 2023 and February 2024, Infosys McCamish Systems (IMS), a third-party provider handling Bank of America's deferred compensation plans, suffered a major cybersecurity breach. The incident resulted in unauthorized access to personal data of roughly 57,000 Bank of America customers, including names, addresses, Social Security numbers, and financial account information. The LockBit ransomware gang publicly admitted to attacking IMS. In response, Bank of America is offering affected individuals two years of complimentary identity monitoring services. In a separate incident reported in April 2025, Bank of America disclosed another data compromise involving sensitive customer records related to savings bonds that were intercepted during transmission. These documents contained personally identifiable information such as full names, physical addresses, contact numbers, Social Security identifiers, and bank account details. Ongoing complex frauds (April 2025): Bank of America issued an urgent warning about increasingly complex cyber frauds aimed against its clients. These scams entail contacting individuals via various channels (emails, SMS, calls) claiming critical concerns with their accounts and pushing them to click harmful links or attachments that install malware, allowing hackers to control their devices.

2.2 INTERNATIONAL CYBER LAWS:-

1. UK cyber law:-

The UK banking sector's cybersecurity framework operates under a comprehensive regulatory structure safeguarding financial system integrity, customer information, and operational continuity. Below are the key legislative instruments and regulatory provisions:

62 The UK General Data Protection Regulation (GDPR) and Data Protection Act 2018 constitute the foundation of data protection laws in the UK, setting standards for processing and securing personal information. Core provisions require that data processing must be lawful, fair, and transparent, with information collected only for specific, justified purposes. This regulatory framework is also known by other names, including the Clinger-Cohen Act.

The UK maintains its position at the forefront of cybercrime regulation, having introduced the groundbreaking Computer Misuse Act 1990. However, with rapid technological evolution and new forms of digital offenses, the UK Parliament implemented revised cybercrime laws that came into force on 7th November 2006.

This revision specifically targets Denial of Service (DoS) attacks, prescribing maximum 10-year sentences - addressing a gap in the original Act which only penalized unauthorized data modification without recognizing DoS as distinct cybercrime. The updated legislation defines DoS attacks as overwhelming servers with excessive data traffic until failure occurs.

The Information and Computer Technology Act 2006 specifies these offences as punishable by up to 10 years imprisonment:

- Unauthorized computer access
- Data or program corruption/obstruction
- Program deletion. Additionally, conspiring to commit these offences carries a maximum 2-year sentence.

6 Here is an overview of key cybersecurity laws and regulations essential for safeguarding the UK's digital ecosystem and critical infrastructure:

- **Data Protection Act (DPA) 2018**
- **UK General Data Protection Regulation (UK-GDPR)**
- **Network and Information Security Directive (NIS 2)**
- **Digital Operations Resilience Act (DORA)**
- **UK Operational Resilience Framework**
- **EU Cybersecurity Act**
- **EU Cyber Resilience Act**
- **Computer Misuse Act 1990**
- **EU Artificial Intelligence Act**

- **Telecommunications (Security) Act 2021**
- **Privacy and Electronic Communications Regulations (PCER)**

126 Numerous UK enterprises additionally comply with international cybersecurity standards like PCI-DSS, NIST, SOX, and HIPAA, though these are not legally mandated under UK jurisdiction.

2. **Republic of India's cyber laws:** In 2003, the Indian Government made a public announcement about its intention to formulate a solid law to tackle the increasing acts of cyber-crimes. 66. Applying computer systems for hacking. Hacking constitutes deliberate and wilful actions causing unlawful damage or injury to individuals or the public, where a person intentionally obtains unauthorized access to computer systems through any method with the purpose of maliciously changing or corrupting stored data.
3. **China's People's Republic of Cyberspace Law** [11]Chinese internet crime legislation primarily addresses key concerns through components of the People's Republic of China's civil and criminal laws. The Public Security Bureau handles internal security while the Ministry of State Security manages external security. Computer information network and internet security regulations, jointly issued by the State Council, became effective on December 11, 1997, and December 30, 1997, respectively, formally establishing the Public Security Bureau's (PSB) responsibilities in this domain. In November, a ransomware attack on the Industrial and Commercial Bank of China (ICBC) - China's largest financial institution and the world's biggest bank by assets - disrupted global markets. The cyberattack targeted ICBC's US subsidiary, briefly interrupting US Treasury market activities and blocking client transactions. Although ultimately controlled, this incident raised serious concerns about vulnerabilities in major financial organizations, highlighting the critical necessity for strengthened global cybersecurity measures.[12]

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4. **United States of America cyber law**

   The National Security and Homeland Security Advisors have been tasked by President Barack Obama with reviewing the government's cyber security plan, initiatives, and initiatives, including the implementation of new laws to fight cybercrime. On February 7, 2010, US Vice President Joe Biden spoke at the 45th Munich Conference on Security Policy. He stressed the importance of addressing terrorism and cyber-security among other things.

[11] https://www.lawyersnjurists.com/article/international-perspective-on-cyber-crime/

[12] https://gfmag.com/banking/icbc-industrial-and-commercial-bank-of-china-ransomware/

The Federal Criminal Code (USA)

The U.S. Federal Criminal Code addresses cybercrimes through three primary approaches:

a.Theft and associated actions concerning access devices

b.Computer-related fraud and related activities

c. The system, stations, and communication lines

The 1980 U.S. Privacy Protection Act

The United States Privacy Protection Act of 1980 safeguards an individual's privacy rights concerning data stored on computers and other electronic devices under their possession, such as laptops, floppy disks, and diskettes. Law enforcement officers may access and search electronic records only after obtaining a proper court-issued search warrant and demonstrating probable cause that the information contains evidence of criminal activity. Consequently, computer-related searches remain constitutional provided they do not infringe upon an individual's right to privacy.

The U.S. Computer Security Act of 1987 was enacted by Congress to require federal agencies to improve protection measures for government computer systems. This legislation tasked the National Institute of Standards and Technology (NIST) with developing security standards for federal information technology infrastructure.

5. CANADA:-

Key Features of Cybercrime in Canadian Banks:

●Rising Threat: The Office of the Superintendent of Financial Institutions (OSFI) has recognised cybercrime and artificial intelligence as major threats to Canadian banks, with "high impact" cyber attacks nearly tripling between 2022 and 2023.

●Customer Concerns: The vast majority of Canadians are concerned about online banking cybercrime and possible data breaches at their financial institutions. Many people would consider switching banks if a data breach occurred.

●Cost of Breaches: Data breaches in the Canadian financial services sector are among the most expensive in the world, with an average cost of more than $9 million.

●**Common Cyberattack Techniques:** Malicious actors employ multiple approaches, such as: Phishing, Vishing, and Smishing - deceptive practices using fraudulent emails, voice calls, or SMS messages to extract sensitive data. Canada's Criminal Code categorizes unauthorized computer access as illegal under Section 342, while unlawful communication interception is prohibited by Section 184. Having ratified the European Convention on Cybercrime, Canada implemented the Council of Europe's cybercrime framework on November 23, 2001. This

international treaty defines five principal cybercrime categories: security/privacy violations, unauthorized system intrusion, intellectual property theft, confidentiality compromises, and online fraud operations.

AUSTRALIA While Australia lacks a single, consolidated "cyber law" for banks, a strong structure of legislation and regulations governs cybersecurity in the financial sector. These rules are intended to secure client data, safeguard the financial system's stability, and hold businesses accountable for security procedures. Here's a breakdown of the important pieces of legislation and regulatory guidelines related to cyber laws in Australian banks:

1. Privacy Act of 1988 and the Australian Privacy Principles (APPs)
2. The Security of Critical Infrastructure Act 2018 (SOCI Act) and its amendments:
3. APRA Regulations and Guidance:
4. The Australian Securities and Investments Commission (ASIC) Act 2001

The essence of cybercrime legislation has only recently been introduced in Australia as compared to other countries, with different strategies being implemented by different State and Federal governments. Concerning the problem of cybercrime, both the Federal and State Governments in Australia introduced several offences by passing the laws. A fresh Act named the “Cyber Crime Act, 2001” was introduced in the Australian legal framework and the provisions under this Act came into force on 2002-04-02, which has amended the laws concerning computer offenses. The Act establishes the following three serious computer offences:

I. Unapproved entry: The maximum penalty for the more grievous crime committed is suffered when modifying or impairing with the aim of perpetrating the crime. For example, if an individual unlawfully accesses a bank's computer system to obtain credit card information for fraudulent financial gain, they will face arrest, prosecution, conviction, and appropriate penalties for their attempted fraudulent activities. Unauthorised data alteration a person is not specific if the modification they are going to make will encompass data, then they can be imprisoned for up to a decade at most. It is for this purpose incorporated to solve several situations, such as: In a computer system, when an unauthorized invader gets unauthorized access to a computer and maliciously alters data.

II. Privacy violations related to respect and contemplation for the user’s private electronic correspondence

III. The offense carries a potential enhanced penalty of 10 years' imprisonment, designed to deter activities like Denial of Service (DoS) attacks - where systems are flooded with excessive traffic causing server failure. The legislation establishes four additional computer-related offenses: (1) Illegal access to or modification of protected data, punishable by up to two years imprisonment;

(2) Unlawful deletion of computer-stored information, also carrying a two-year maximum sentence; (3) Possessing data with intent to commit cybercrimes, subject to three years imprisonment; and (4) Creating, distributing, or obtaining data for criminal purposes, with a three-year maximum penalty under the Act. Australia employs a comprehensive strategy against banking sector cybercrime, combining legal measures with regulatory oversight.: Commonwealth legislation: The Cybercrime Act of 2001 establishes federal criminal charges for computer-related crimes. The Proceeds of Crime Act of 2002 allows for the forfeiture of assets acquired via cybercrime. The Privacy Act of 1988 governs how organisations, including banks, handle personal information, and it contains required data breach notification procedures.State and Territory Legislation: Each state and territory has its own laws governing computer crimes and fraud. The Australian Prudential Regulation Authority (APRA) sets prudential rules for banks, including operational risk and cybersecurity. APRA expects banks to have strong frameworks for managing cyber risks and ensuring operational resilience.

5. JAPAN

Japan is among the nations that have ratified the European Convention on Contracts. on Cybercrime created to stop cybercrimes. Two laws in Japan address protecting people from cybercrimes: the act of 2000 on unauthorised computer access this particular act's objectives include the prohibition of acts involving unauthorised computer access, eradicating computer related crimes that are carried out through a telecommunication line, ensuring proper transmission which is accomplished through access control functions, and the promotion of a healthy growth of the information and telecommunications society of the future. Also, it sets a few rules defining concepts associated with the act. codic Terminal also provides several other sections that categorize the activities related to unauthorised computer access as crimes, which in turn are under penal rules. The 1999 Computer Crime Act amends the Japanese penal code and, apart from it, also introduces a new one to fit the problem of cybercrime. many of the provisions were changed by this act to fit the new issues occasioned by cybercrimes. measures that are being taken internationally to mitigate against cyber crimes.

Increased Cyber Incidents: Japan has seen an increase in cybercrime cases, notably those targeting the financial sector. In 2019, online banking fraud increased significantly and resulted in losses exceeding ¥2.5 billion. Ransomware assaults: Japanese organisations, notably those in the financial sector, have experienced an increase in sophisticated ransomware assaults, causing disruptions. Phishing and malware remain popular tactics for thieves to acquire banking passwords and personal information. Phishing attacks frequently imitate banks, tricking users into disclosing valuable information or installing malware. Business Email Compromise (BEC): While specific bank data is not always isolated, BEC assaults against Japanese organisations can have an impact on financial activities and bank connections.

6. **BRAZIL**[13]Brazilian public institutions, banks, and citizens face significant threats from cybercriminal organizations. In October 2016, shortly after the Olympic Games concluded, attackers compromised and altered the DNS records for all 36 web domains belonging to Brazilian financial institution Banrisul. The perpetrators redirected both computer and smartphone users to fraudulent websites and allegedly intercepted ATM transaction details, potentially obtaining victims' payment card data. During the May 2017 worldwide 'WannaCry' ransomware outbreak, affected Brazilian entities included the national social security administration, telecommunications company Vivo's main offices, São Paulo's public prosecutor department, and state-owned energy firm Petrobras.
7. **RUSSIA**: In 2024, Russia's central bank documented more than 750 cyberattack incidents targeting financial organizations. Most attacks aimed to disrupt corporate information systems or make services inaccessible (distributed denial-of-service attacks). Cybercriminals have also intensified efforts to compromise financial service providers' vendors as a pathway to infiltrate institutional networks.
8. **FRANCE**: The Bank of France was subjected to a distributed denial-of-service (DDoS) attack, purportedly carried out by the hacktivist organisation Anonymous as part of Operation OpIcarus. The hack crippled the bank's website, making it unreachable for many hours. Anonymous claimed responsibility and stated that the attack aimed to show solidarity with the #NuitDebout demonstrators and defend the concept of freedom, matching their online efforts with the ongoing street protests.
9. **INDONESIA**: Types of Cybercrime Against Banks in Indonesia: Online Banking Fraud: This includes a variety of methods for stealing login credentials and conducting unauthorised transactions. Phishing/Smishing: Deceptive emails/texts posing as banks to extract sensitive data. Ransomware: Malicious software that locks banking systems or client files, demanding payment for restoration - exemplified by Bank Syariah Indonesia's May 2023 attack causing operational disruptions. BEC: Fraudsters pose as company officials to authorize fraudulent transfers. Data Theft: Cyber intrusions into bank networks leading to unauthorized access of personal records, as occurred in Bank Syariah Indonesia's 2023 breach exposing customer/staff details. Social Engineering: Psychological manipulation to obtain confidential data or prompt security-compromising actions. Malware Infections: Hostile programs designed to extract information or impair operations. ATM Skimming: Illegal devices capturing card data at cash machines: Although less commonly mentioned in recent headlines for Indonesia, it remains a possible hazard. Scammers create bogus mobile banking apps to steal credentials and financial information. Cyber espionage

[13] https://igarape.org.br/brazil-struggles-with-effective-cyber-crime-response/(10/2024)

refers to advanced persistent threats (APTs) that target financial institutions for strategic benefit. Deepfake Technology: An emerging threat in which artificial intelligence is utilised to generate fake photographs and audio in order to trick biometric verification processes.

Impact of cybercrime on Indonesian banks:

Financial Losses: Fraudulent transactions and theft cause huge financial losses for banks and their clients.Reputational Damage: Cyberattacks can undermine client trust and harm the bank's image. Operational Disruptions: Attacks such as ransomware can paralyse banking systems, preventing clients from using services. The BSI ransomware outbreak in 2023 disrupted service for several days. Data Exposure: Compromised personal and financial information can lead to identity theft and other criminal acts. Customer Confidence: Frequent cyber events might erode public trust in digital banking security. Increased Operational Costs: Banks must invest extensively in cybersecurity protection and incident response, which increases their operational costs. Legal and regulatory sanctions: Failure to protect customer data may result in fines and other penalties from regulatory organisations.

Attempts to combat cybercrime:

Increased Regulatory Scrutiny: The OJK and BSSN are striving to improve cybersecurity regulations and enforcement in the financial sector. Banks Invest in Advanced Security Technologies, Multi-Factor Authentication, Transaction Monitoring, and Customer Awareness Programs. Collaboration and Information Sharing: Banks, regulatory authorities, and law enforcement agencies are increasingly working together to exchange threat intelligence and coordinate cyber incident responses.Public Awareness efforts: Banks and government organisations are running efforts to educate the public about cyber hazards and how to avoid them. Establishment of Cyber Incident Response Teams (CIRTs): Regulations now require financial institutions to form and register CIRTs to monitor and respond to cyber incidents effectively.

10. **TURKEY**: Cybercrime offers a substantial and evolving threat to Turkish banks, reflecting global trends. Here's an overview of the important features:Types of Cybercrime Against Banks in Turkey:Phishing attacks are common, with attackers mimicking large Turkish banks via emails including malicious attachments (.EXE,.JAR) aimed to install malware and gain control over infected PCs. These emails frequently provide consumers with bogus debt letters or credit card statements. Malware and Backdoors: Sophisticated malware, such as the Java-written backdoor "JRat," is used to acquire unauthorised remote access to compromised machines within bank systems or owned by customers. This enables attackers to steal data, install more malware, or utilise hacked PCs for malevolent purposes.Distributed Denial of Service (DDoS) Attacks: While the offered sources do not place a strong emphasis on DDoS against Turkish banks, they are a regular danger to online services around the world and could be used to disrupt banking operations.

Online fraud involves a variety of approaches, including unauthorised access to information systems in order to steal data or influence transactions.Misuse of bank and credit cards involves unauthorised usage, counterfeiting, and obtaining cards through illegal means.

Cyber Laws & Regulations in Turkey:

Turkey has a legal framework in place to prevent cybercrime, which includes laws applicable to the banking sector:

- Article 243 of Turkish Penal Code No. 5237 addresses cybercrime, namely illegal access to computer networks.
- Preventing a system's operation and data deletion, alteration, or corruption (Article 244).
- Misuse of bank or credit card (Article 245).
- Making, selling, buying, or accepting Prohibited Devices and Programs (Article 245/A).
- Computer and Communications Fraud (Article 158/1-f).
- Larceny Committed with the Use of Data Processing Systems (Article 142/2.e).

Attempts to combat cybercrime:

Specialised Law Enforcement Units: The National Cybercrime Department of the TurkishNational Police (TNP) and specialised cybercrime bureaus within Chief Public Prosecutors' Offices investigate cybercrime. National Cybersecurity Strategy: Turkey has created national cybersecurity strategies to strengthen its defence capabilities. The USOM (National Cyber Incident Response Centre) monitors cyber security incidents, issues alerts, and coordinates responses. Information Sharing: Banks, the Turkish National Police, and the Turkish Computer Emergency Response Unit (TR-CERT) meet on a regular basis, while information sharing between banks has previously been found to be minimal.

11. **NETHERLANDS:-** Cybercrime in Dutch banks is becoming a major worry for financial institutions, consumers, and the Dutch government. Cybercriminals target not only individual consumers to obtain access to their bank accounts via phishing and malware, but also banks to steal significant sums of money, customer data, or disrupt operations via ransomware and DDoS assaults.

Key trends and information: Rising Cybercrime: While traditional crimes such as burglary are down, cybercrime is increasing in the Netherlands, affecting a growing number of people. Cybercriminals want to steal money and sensitive customer data from banks. Attacks try to disrupt the functioning of financial institutions, potentially affecting the payment system. Dutch Central Bank Warning: In early 2025, the Dutch Central Bank (De Nederlandsche Bank - DNB) issued a warning about the growing threat of DDoS assaults, recommending residents to carry some cash at home as a backup plan for any disruptions to digital payment systems. The

frequency and sophistication of cyberattacks on financial institutions have reportedly increased by 50% since 2023. De Nederlandsche Bank (DNB) regulates financial organisations' ICT risk management, including information security and cybersecurity. They also use "TIBER" tests to evaluate the cyber resilience of critical financial infrastructure.

The DNB and other organisations advise people to:

●Never share login information with anybody.

●Install the most recent security updates for banking software.

●Check your bank accounts regularly for any unauthorised activity.

●Report incidents to the bank right away.

●Be wary of strange links and requests for personal information.

●Use strong, unique passwords, and activate two-factor authentication wherever possible.

●Finally, cybercrime poses a substantial and evolving threat to banks in the Netherlands.

To reduce these risks, a multifaceted approach that includes robust security measures implemented by financial institutions, strong legal and regulatory frameworks, government activities, and enhanced public awareness is required.

12. **PORTUGAL :** Cybercrime at Portugal's banks is a developing concern, in line with global trends. Cybercriminals use increasingly sophisticated tactics to target both financial institutions and their clients.

Key trends and information:

●Phishing Attacks: This is a common tactic, with fraudsters mimicking Portuguese banks (such as Caixa Geral de Depósitos, Novo Banco, and Montepio Geral) by email and SMS. These frequently drive users to fraudulent websites that steal login passwords and personal information.

●Malware: Malicious software, including banking trojans like QakBot, is used to steal banking passwords and other sensitive data.

●Data Breaches: While specific large-scale data breaches in Portuguese banks haven't received as much attention as in other nations, the threat of data exfiltration remains a concern.

●Ransomware: This sort of attack, in which systems are held hostage for ransom, poses a substantial danger to numerous sectors in Portugal, particularly the banking industry, as it has in other European countries.

●Business Email Compromise (BEC): Targeting businesses to induce fraudulent payments is a well-known practice around the world, and it is likely that it also applies to Portugal.

●DDoS Attacks: The Portuguese Central Bank (Banco de Portugal), part of the European Central Bank system, has issued a warning about the growing threat of DDoS attacks on financial institutions.

Regulatory Landscape and Measurements:

●Banco de Portugal: As the central bank and financial supervisor, Banco de Portugal has regulations governing ICT risk management and cybersecurity in the financial industry. They also engage in the Banking Industry Forum on Cybersecurity and Operational Resilience (FICRO), which helps to coordinate efforts and share best practices.

●As an EU member, Portugal is subject to the Digital Operational Resilience Act (DORA), which aims to improve the digital operational resilience of financial institutions. The European Commission has formally cautioned Portugal for failing to completely transcribe DORA into national legislation by the January 17, 2025 deadline, and it has two months to reply. Full deployment is likely to improve cybersecurity needs.

●Personal Data Protection Act: Portugal follows the EU's General Data Protection Regulation (GDPR), which requires banks to implement strong security measures for personal data and to notify customers of data breaches.

●The National Cyber Security Centre (CNCS) in Portugal strives to improve the country's cybersecurity posture, provide guidance, and increase awareness about online fraud aimed at banking consumers. They also discuss best practices for online banking security.

●Cybercrime Law (Law 109/2009): Portugal has particular cybercrime legislation that covers offences such as illicit access, data damage, fraud, and phishing.

●Investment in Cybersecurity: Recognising the growing threats, organisations in Portugal, notably financial institutions, have increased their investment in cybersecurity solutions.

Finally, cybercrime presents a big challenge for Portuguese banks. The government is attempting to tighten its legal and regulatory framework, and financial institutions are investing in security measures. Customers must remain vigilant and attentive in order to prevent successful intrusions.

13. SWEDEN:

Sweden, a highly digitised nation that relies heavily on online banking and digital payment systems such as BankID, is facing a huge and expanding cybercrime scenario aimed at its financial industry. Key trends and information:

● Increased Digital Fraud: As Sweden transitions to a cashless society, online fraud and digital crime have grown. Criminals reportedly stole 1.2 billion kronor through scams in 2023, more than tripling the amount taken in 2021.

●BankID Exploitation: BankID, a popular digital identity system, has become a target for clever fraudsters who deploy plausible scams to deceive customers into confirming illegal transactions.

●Malware and Phishing: Traditional methods like as phishing emails with malicious attachments (e.g., the JRat backdoor) are still used to gain access to computers and steal passwords. ●DDoS Attacks: In April 2025, the Swedish Bank-ID service was subjected to a Distributed Denial of Service (DDoS) assault, which disrupted service but did not compromise user data. This demonstrates the vulnerability of crucial digital infrastructure.

●Ransomware: While Sweden's defences against ransomware are apparently improving, the danger remains serious, with attacks getting more severe and targeting vital weaknesses. ●Business Email Compromise (BEC): This sort of fraud, which attempts to trick firms into making unauthorised payments, is also an issue.

●Organised Crime Involvement: Organised crime and gang activities account for a major share of fraud offences in Sweden, with sophisticated methods used to exploit the welfare system.

●Exploitation of Technical Vulnerabilities and AI: Cybercriminals are becoming increasingly adept at exploiting technical flaws and are beginning to use AI to commit fraud against both customers and bank employees.

Regulatory Landscape and Measurements:

The Swedish Criminal Code states that hacking is a criminal offence punishable by fines or imprisonment, with more severe consequences for serious offences.
Act on Information Security for Critical and Digital Services: Enacted the EU's NIS regulation to improve the security of network and information systems for critical services, particularly finance. The Cybersecurity Act (EU) aims to strengthen cybersecurity across the EU by allowing for recognised certifications.The Digital Operational Resilience Act (DORA): As an EU member, Sweden is subject to DORA, which aims to improve the digital operational resilience of the financial sector.Established in 2020, the National Cybersecurity Centre (NCSC) aims to strengthen national coordination and response to cybersecurity threats.

14. **OECD**: The primary themes and types of cyber laws and regulations popular in OECD nations regarding banks:
    1. **Data Protection and Privacy Regulations:** Financial institutions operating in OECD member countries are obligated to follow extensive data governance and privacy requirements when managing customer information. These regulations commonly include core provisions such as: **Legal processing mandate:** Information must be handled in accordance with legal standards, ensuring fairness and transparency.
    2. **Specific usage requirements:** Collection and utilization of data must be restricted to clearly defined, lawful objectives.

3. **Minimal data requirements:** Institutions should only acquire and store the absolutely necessary personal information.
4. **Accuracy obligations:** Maintained data must be kept correct and current.
5. **Time-bound retention:** Personal information should not be stored beyond required periods.
6. **Security protocols:** Implementation of protective measures to prevent unauthorized disclosure, destruction, or alteration of sensitive data.
7. **Financial sector-specific regulations**: Many OECD nations have financial regulators (e.g., banking supervisors, securities commissions) who set cybersecurity rules and guidelines for banks and other financial firms. These restrictions frequently focus on: Operational Resilience: Banks must have frameworks in place to ensure they can continue to function and provide vital services during and after cyber catastrophes. This encompasses business continuity and disaster recovery planning. Risk Management: Banks must build and maintain comprehensive information security risk management procedures to detect, assess, and mitigate cyber risks.Governance and Oversight: Establishing requirements for boards and top management to monitor and account for cybersecurity.
8. **Critical Infrastructure Protection Laws:** Recognising the financial sector's systemic importance, certain OECD countries have included banks in their critical infrastructure protection regulations. These regulations frequently impose special security duties on designated critical infrastructure firms to ensure their resilience to a variety of threats, including cyberattacks.

   Examples include Australia's Security of Critical Infrastructure Act and comparable legislation in other OECD nations that recognises the financial sector as critical.
9. OECD countries have legislation in place to address cybercrime, including targeting banks and customers. These laws typically address offences like unauthorised access to computer systems. Data theft and fraud. Malware dissemination. Phishing and identity theft. These rules establish a legal basis for pursuing cybercriminals who target the financial sector.

2.3 International treaties:-

1. The international droit conference of Germany held in 1992

The collegiums on “computer crime and other crimes against information technology” were held by association internationale droit ponel (adip) in wartzburg, germany. the report indicates that based on its sample, police were only receiving 5% of the cyber crimes reports. this report identified the following as contributory causes to the non-disclosure of cybercrimes:here, it is extremely difficult to pinpoint unlawful actions because the computer hardware and nesting chain operate rapidly and store vast amounts of information.

(ii)The current employees within the law enforcement agencies lack the technological know-how to combat cybercrime (iii). For this reason, such victims never report the crime to the police since they feel that they will be constantly harassed and that reporting the crime will not be productive.

(iv). The victim is also made to avoid reporting the incident, fearing social backlash (v). Other reasons why cybercrimes are not reported include: embarrassment of the incident, loss of confidence from investors/shareholders, company goodwill and public confidence, among others.

2.G-7 summit in cybercrime, the twenty-second (1996).

During the G-7 counterterrorism conference in León, France (July 1996), member nations committed to accelerating discussions and collaboration through appropriate bilateral and multilateral meetings regarding encryption technologies. These measures would permit, under specific circumstances, lawful government access to digital communications and data to combat cyberterrorism and associated crimes while safeguarding legitimate users' rights. The summit particularly stressed the importance of securing information systems, protecting personal data, and preserving intellectual property rights.

3.G-8 working group on high-tech crime (1998).

A hi-tech crime sub-group of g-8 countries was formed in march 1998 to fight the menace of cyber-crime under the umbrella of international cooperation programme. some of its functions are to scrutinize the g-8 countries' legal systems, coordinate international forums, render cross-border retrieval of stored data, and aids in hi-tech crime investigations over internet proceeding of unlawful change to or distribution of data/evidence.thus, in an attempt to ease the exchange of information on cybercrime, every g-8 country has an identified contact in their law enforcement agencies. members from consumer and industry organizations attended the g-8 subgroup conference held in paris france in 1998, to discuss on internet issues that affects consumer and industry establishments and to come up with measure that would offer protection to these via e-commerce.

5. **The cybercrime discussions held in the Paris conference held in the year 2000.** Around 300 attendees, primarily comprising judges, law enforcement officials, diplomats, legal experts, and business leaders from G-8 nations, participated in a May 2000 cybercrime symposium in Paris. The event emphasized the urgent need for worldwide legislation targeting hackers, software pirates, spammers, and malware creators whose online activities were severely disrupting digital lives. Participants unanimously recognized the necessity for an international treaty addressing cybercrime matters, particularly the establishment of a global criminal court with authority to apprehend and adjudicate cybercriminals worldwide. Consequently, delegates concluded that nations must maintain close collaboration and coordination in investigating and prosecuting these sophisticated offenses, regardless of territorial borders, due to the transnational nature of cybercriminal operations.

5. Internet treaty of the Council of Europe signed in January 2001

The Council of Europe has been dealing with the increasing tendency of danger connected with hacking and other computer crimes for decades, starting in the 1980s. all the member states of the council of europe have agreed on the fact that dealing with the problem of relative internet infrastructural insecurity any cooperation with other countries for fighting cybercrime has to be trusting, mutual and bilateral. The council of europe enumerates the following three (i). Challenges associated with technology that increases the difficulty of apprehending the internet cybercriminals by the police.(ii). It will be useful to change several legislative acts as substantive and some procedural legislation has not developed in consonance with the contemporary advances in technology. this paints lacunae of legal nature to the successful prosecution of cyber criminals.Finally, there is a need to upgrade physical facilities in order to enable the police organizations to cope with the advancement of technology in practice, especially with the view of increasing readiness of citizens to fight cybercrimes.

6. Budapest, November 2001, European Convention on Cybercrime bank

The Budapest Convention on Cybercrime, adopted on November 23, 2001, marked a significant advancement in establishing harmonized global cyber legislation. This international treaty sought to confront the evolving challenges posed by digital transformation, technological convergence, and increasing globalization of computer systems and electronic data, along with the emerging threats these developments created for cybercrime proliferation.

Recognizing the critical necessity for global cooperation and a standardized legal framework to protect against digital offenses, the convention established a detailed treaty comprising 48 provisions across 4 distinct sections. The legal standards set forth in this European initiative have subsequently served as a foundational blueprint for numerous nations developing their own cybercrime laws and security protocols through various multinational platforms.

7. Fourth International Conference on Cybercrime, Cybersecurity, and Law 2004

Chandigarh, India hosted an international conference on e-security, cybercrime, and law on February 19–20, 2004. The following were the primary topics for discussion at the conference:

(i). Corporate governance, industrial incursions, and network providers' hacking responsibility all require careful consideration when it comes to network security.

(ii) It was necessary to improvise data and transmission standards as well as encryption techniques. During the meeting, topics such data banking security and electronic fund transfers were also covered.

(iii) Significant focus and realignment were required concerning computer forensic procedures, maintaining digital evidence integrity, and law enforcement methodologies for evidence collection.

(iv) Participants stressed the necessity for comprehensive legislation addressing cyber law and data security. Discussions encompassed diverse subjects such as legal frameworks for network protection, law

enforcement in cyberspace, judicial functions in technology-related cases, and community involvement in cybercrime deterrence.

8. International Conference on Cybercrime, Kiev, 2004

From May 26-28, 2004, Zaporozhye State University in Ukraine hosted an international conference jointly organized by the Computer Crime Research Centre and the World Anti-Criminal and Anti-Terrorist Forum. The event's discussion topics encompassed cyberterrorism, cybercrime prevention, intellectual property infringements, digital piracy, and legal aspects of information security.

9. The Asia-Pacific Economic Cooperation (APEC) 2004.

APEC member nations held a summit committing to create an extensive legal structure for cybercrime prevention, control, and cybersecurity improvement in accordance with recognized international legal standards. During their November 2004 ministerial meeting in Santiago, Chile, participating countries agreed to strengthen economic collaboration against cyber threats.

10. International Conference on Cybercrime, Brazil, 2006

The International Cyber Crime Conference, the third major global gathering on this subject, took place in Brasília from November 6-9, 2006, attracting hundreds of IT experts to examine computer-related offenses and their prevention strategies. Key discussion points included: transnational cybercrime, investigation methods and extradition procedures for digital offenders, modern cybercrime task force structures, critical infrastructure security initiatives, cybersecurity measures, underground hacking operations, illegal online file-sharing, and various forms of electronic and internet-based criminal activities.

11. Eleventh Congress on Offender Treatment and Crime Prevention (2005)

The 11th UN Crime Congress in Bangkok (April 18-25, 2005) brought together delegates to analyze worldwide cybercrime patterns and discuss key prevention strategies. Attendees concluded that existing domestic laws remained inadequate to curb the escalating transnational cybercrime threat, necessitating enhanced multilateral cooperation at bilateral, regional, and international levels to improve crime prevention and criminal justice responses.

12. Cybercrime: Seventh International Conference (2007)

The Seventh International Cyber Crime Conference was held at Delhi's Vigyan Bhawan on September 12, 2007, emphasizing the crucial need for enhanced cyber security awareness and effective preventive strategies against digital offenses. In his inaugural address, then Union Home Minister Shri Shivraj Patil observed that "while cybercrime emerged relatively late as a serious criminal category, it now encompasses an extensive range of unlawful activities."

The computer systems of crucial installations are vulnerable to major security breaches caused by hacking, spoofing, and botnet assaults. The potential risk posed by these attacks to the country's security is enormous.

Money laundering for terrorist funding through online avenues has reached frightening dimensions on a global scale.

13. The Terrorism and Organised Crime International Conference (2008) took place on August 25, 2008, in Anaheim, California, addressing critical issues such as:

- Domestic and international terrorism
- Misuse of WMDs
- Organised crime networks
- Human trafficking and smuggling operations
- Identity fraud
- Internet-based narcotics trade
- International financial laundering operations
- Weaknesses in electronic commerce systems
- Digital fraudulent practices
- Computer forensic methodologies

The conference emphasized forensic science's growing importance in cybercrime investigations and the critical involvement of information technology specialists in law enforcement processes.

14. The Third International Conference addressing Information Technology Security and Privacy Concerns (2008) was convened in Prague, Czech Republic, on September 3, 2008. focusing primarily on information technology and preventing illegal activities stemming from technological progress. Participants unanimously acknowledged the urgent need to establish international legal frameworks to protect both individual privacy rights and national security interests, particularly for digital technology users.

15. Cybersecurity Conference Defence Techniques (2009)

A global conference addressing cybersecurity and defence strategies was conducted in Gatineau, Quebec, from November 2-3, 2009. Participants concluded that immediate action was required to enhance protective systems against escalating digital threats. Preceding this event, Washington, DC hosted a Cyber Crime Security Control System Conference from October 19-21, 2009, which examined collaborative solutions to cyber risks, analysed existing national security protocols, and emphasized expanding international cooperation. Additionally, Athens, Greece, welcomed attendees to The Emerging Security Information Systems and Techniques Conference (June 18-23, 2009) highlighted different countries' progress in developing intelligence security frameworks.

16. International Conference on Cybercrime and Digital Forensics, 2009

The International Conference on Digital Forensics and Cybercrime in Albany, New York (September 30-October 2, 2009) debated whether standardized methods should be adopted for investigating technology-related cybercrimes. This followed the Digital Forensics Security and Digital Law Conference in Pretoria, South Africa (July 22-24, 2009), which focused on safeguarding computer-transmitted and web-based

information from cyber threats. Phishing remains attackers' predominant method for illegally obtaining sensitive data. Digital covering is even more important when it comes to cybercriminals, especially those involving copying/piracy. To support the examination of crime cases that imply digital transgressions, digital law needs enhancement with civil and criminal consequences for breaches of digital forensic services.

17. Council of Europe, Fifth Annual Conference on Cybercrime (2010) Held on March 25, 2010 under the auspices of the European Parliament's Committee on Civil Liberties, the conference centered on two primary objectives: (i) reducing accessibility of child pornography online and (ii) developing network architectures to strengthen IT security against cybercriminal activities. Participants generally agreed that ongoing legislative enhancements were needed regarding cybercrime prevention, control, and digital security. Most attendees acknowledged the necessity for greater confidence in information technologies, emphasizing that international cooperation remains crucial for combating web-based offenses. Special attention was given to protecting sensitive financial, commercial, technical, and defense-related data vulnerable to cyber intrusions. Delegates highlighted challenges in internet jurisdiction, where determining the location of offenders and victims proves difficult due to the borderless nature of digital spaces. They proposed that formal legal recognition of digital records could significantly improve cybersecurity frameworks.

18. The April 2010 UN Crime Prevention Congress enabled participating nations to strengthen existing global measures against cybercrime threats. Member states resolved to launch coordinated efforts against digital offenders, with particular focus on transnational cyber fraud operations and internet-facilitated terrorist activities.

19. August 2010 saw the Fourth International Conference on Cyber Law.

The event occurred in Virginia, USA, from August 18-20, 2010, focusing primarily on developing digital forensic capabilities against global cybercrime, protecting online privacy, and safeguarding intellectual property in digital environments. These recurring international conferences demonstrate the global community's sustained efforts to control and prevent cyber offenses. Simultaneously, numerous countries have enacted their own national cybersecurity legislation.

2.4 OECD member states have typically established legal and regulatory systems to address financial sector cybercrime, generally comprising five key components:

1. Dedicated Cybercrime Laws: Statutes prohibiting illegal system access, data manipulation, and malware development/distribution (e.g., UK's Computer Misuse Act and similar laws in other OECD nations).
2. Data Security Mandates: Requirements like the EU's GDPR and equivalent OECD country laws obliging banks to safeguard customer information and disclose breaches.

3. Financial Industry Standards: Sector-specific cybersecurity guidelines from regulators including central banks and financial authorities (ECB, FCA, APRA, FSA) covering operational resilience, risk mitigation, and incident disclosure.
4. AML/CTF Protocols: Frameworks essential for tracing and recovering illicit proceeds from cyber offenses.
5. Global Collaboration: OECD members participate in cross-border cybercrime initiatives through Interpol, Europol, and mutual legal assistance agreements.

2.5 CYBERCRIME AND CYBERSECURITY IN ASIA PACIFIC REGION [14]

The accelerated adoption of emerging digital technologies including blockchain, cloud services, and IoT has simultaneously introduced new security gaps in both consumer and enterprise systems that malicious actors increasingly exploit. Worldwide cybercrime losses now exceed $7 trillion USD according to current estimates, and it is expected to rise rapidly over the coming years. IoT malware infections alone have recently topped 100 million worldwide. Owing to its swift digitization and elevated uptake of contemporary technology, the Asia-Pacific area is presently among the primary hotspots for cyberattacks.

Cyber security in APAC

Leading the way in APAC on the national cybersecurity index are Malaysia, Singapore, and South Korea. The index evaluates how ready each nation is to stop and handle cyberattacks; all three have established central government agencies with a focus on cybersecurity. Five APAC nations are among the top 15 globally in terms of cybersecurity revenue, with China coming in second place to the US. Network security is the top cyber solutions category in these five major regional marketplaces. While there are always new technological advances to adopt, which poses unprecedented hazards to consumers' and businesses' digital security, technologies like Artificial intelligence (AI) and machine learning (ML) have proven effective in countering cyber threats. Research conducted among APAC businesses reveals these technologies serve multiple cybersecurity functions, particularly in vulnerability assessment and strategic recommendation systems.

Cybercrime in APAC :-

Cybercrime in Asia-Pacific (APAC) banks is a significant and growing threat, owing to fast digital transformation, increased internet usage, and the region's economic potential. Several major patterns and instances emphasise the expanding threat landscape:

Key trends:

[14] Leander von Kameke, Apr 8, 2024 https://www.statista.com/topics/11226/cybersecurity-and-cybercrime-in-the-asia-pacific-region/#topicOverview

Supply Chain Attacks: A significant vulnerability in which attackers target third-party vendors (software, technology providers) to obtain access to banks' systems and consumer data. Recent occurrences involving DBS Bank and Bank of China's Singapore office highlight the implications of compromised printing providers.

Third-Party Risks: According to S&P Global, third-party breaches are the most pressing issue for APAC financial institutions, which is exacerbated by a skills deficit in cybersecurity.

9 AI-Powered Attacks: Cybercriminals are increasingly using advanced AI to conduct sophisticated phishing attacks (mimicking voice and tone).

Lack of Exposure Management: According to research, APAC's top financial institutions do not manage exposure, leaving many internet-facing assets open to exploitation due to obsolete security standards and misconfigurations. Cybercrime-as-a-Service: The emergence of underground economies where cybercrime tools and services are easily accessible lowers the barrier to entry for attackers.

For cybersecurity companies, the region's rapid digital expansion is a constant challenge. Throughout APAC, some of the most vulnerable industries to cyberattacks are very significant. Cybercrime has increased in the manufacturing sector in recent years due to the possibility of targeting production facilities and any point in the supply chain. This has an impact on industries like semiconductor and automotive manufacture, two of which have multiple APAC markets ranked among the top global production hubs. One of the biggest supply chain assaults globally occurred in 2022, involving Japanese Toyota supplier Kojima Industries, whose manufacturing process was temporarily stopped by a ransomware attack. Infostealers, cryptominers, and versatile malware are further forms of cybercrime that are regularly reported in the Asia-Pacific region.DBS Bank and Bank of China Singapore experienced ransomware attacks on their printing providers, compromising customer data. Latitude Group Holdings (Australia): A third-party vendor compromised 14 million client records, resulting in a serious data breach.Medibank (Australia): Millions' personal information was compromised after attackers stole credentials from a third-party IT services provider. Impersonation frauds targeting bank customers have increased in Australia and Singapore, causing significant financial losses.

Key insights

Country with the highest data breach density	**Australia**
Highest cyber security revenue growth	**South Asia**

2.6 CYBERCRIME AND CYBERSECURITY IN AUSTRALIA[15]

Both the likelihood of cybercrime and the risk of cyber security breaches are rising in Australia. The globe has become more digitally connected, which has given hackers additional chances. A large portion of the world was compelled to work from home or remotely due to the COVID-19 pandemic, which exposed businesses to a variety of new IT requirements and security threats. To comply with these new regulations, organisations have to quickly adapt and create and apply cybersecurity procedures; this job is far from over. With the speed at which technology is developing, both individuals and organisations need to prepare for the possibility of cyber-attacks, which can include virus attacks, online scams, identity theft, and data breaches, to mention a few.

The price of cyber safety

Cybersecurity expenditures remain substantial, with Australian data breaches typically incurring costs around $3 million per incident, but there are other factors at stake besides money. Cyberattacks have long-lasting effects on businesses all around the world, such as tarnished brand reputations, lost revenue, and trouble luring in new clients. Maintaining a safe and efficient system can be expensive. Australia's cybersecurity sector was projected to reach 4.5billionin2022, markinga4.5*billionin*2022, *marking* billion increase from 2019 levels, as companies increasingly allocated larger annual budgets for digital protection measures.

Data breaches in Australian banks:-

Data breaches in Australian banks remain a severe and continuous concern, with multiple events emphasising the financial sector's susceptibility and the sensitive information of its consumers. Here's an overview of recent events and trends:

Recent Data Breach Events: April 2025: A large number of login credentials for major Australian institutions, including Commonwealth Bank (Commbank), ANZ, NAB, and Westpac, were discovered on the dark web and **Telegram. This** included more than 31,000 sets of credentials. Investigations indicated that this was not a direct breach of the banks' systems, but rather the result of infostealer malware infecting individual user devices (phones and laptops).

Although the Australian Cyber Security Centre records tens of thousands of cyber incidents annually, two major Australian corporations faced significant breaches in 2022. Telecommunications provider Optus and health insurer Medibank both experienced network infiltrations that exposed sensitive personal data belonging to millions of customers. Cybersecurity represents a pressing concern impacting not only large corporations but also SMEs and individual citizens. While technological progress has increased global

[15] Christopher Hughes Apr 19, 2024 https://www.statista.com/topics/10175/cyber-security-in-australia/#topicOverview

connectivity, it has simultaneously created expanding opportunities for cybercriminals. Despite security innovations keeping pace with market needs, malicious actors continue exploiting vulnerabilities in cyber defenses and applications. Implementing fundamental protective measures and increasing cybercrime awareness remain essential initial steps for organizations and individuals to enhance their security posture against potential attacks.

Key insights

Global avg cost of a data breach	**4.45bn USD**
Share of victimized companies that paid ransoms	**72.7%**

2.7 CYBERSECURITY IN CHINA [16]

Crime increases along with the digitalization of the world. Cybercrime has been one of the threats with the fastest global growth. China, one of the most influential nations on the planet, is a major player in cyberspace as both a victim and an alleged offender. As a result, as businesses, government agencies, and individual customers work to protect themselves from this danger, the cybersecurity industry is expanding. In China, cybersecurity was a relatively tiny field, but it was very important. Cybersecurity brought in only about 140 billion yuan out of the over 11 trillion-yuan yearly revenue of the software industry. Considering that cybercrime costs more than one trillion yuan annually, the industry was vital to every part of the nation despite its small size. Furthermore, the projections indicated that they would rise at an exponential rate in the years to come.

To address growing cyber threats, China implemented multiple legal frameworks. Four primary agencies oversee digital governance: the People's Bank of China, Cyberspace Administration, Ministry of Public Security, and MIIT. The nation created an extensive regulatory structure via three core laws - Cybersecurity Law, Data Security Law, and Personal Information Protection Law - clearly reflecting official acknowledgment of these technological challenges.

The fog of digital war:-

China faces significant vulnerabilities in global cyberspace. While foreign adversaries accuse the country of state-sponsored hacking against international businesses and infrastructure, Chinese entities remain equally exposed to cyber threats. Domestic offenders commit numerous cybercrimes, often operating from safe havens like Saudi Arabia, Cambodia, and Myanmar. External dangers also persist, exemplified by the November 2023 ransomware attack on ICBC (China's major bank) by the Lockbit group.

[16] Daniel Slotta Dec 12, 2023 https://www.statista.com/topics/11680/cybersecurity-in-china/#topicOverview

Cybercrime blurs boundaries between nation-states and criminal networks, maintaining its persistent relevance. The associated risks and costs continue escalating, necessitating stronger digital protections for Chinese businesses and citizens. From an industry perspective, this creates commercial opportunities. As cybersecurity awareness and regulations grow, China must rely on its digital security sector to provide protective hardware, services, and solutions.

Key insights

Largest cybersecurity market	**China**
Size of the Chinese cybersecurity industry	**12.6bn USD**

2.8 CYBERSECURITY IN FINLAND[17]

Despite Finland's reputation for excellent levels of cybersecurity in comparison to other countries, cybercrime in its banks remains a difficult and developing concern. Here's an overview of the important features:

Major Trends and Obstacles: Phishing schemes remain widespread. Finland's National Cyber Security Centre (NCSC-FI) regularly issues alerts about active phishing attempts targeting major Finnish financial institutions, including Danske Bank, Nordea. Fraudsters commonly employ fake authentication portals and psychological manipulation tactics to steal login information. As digital transformation accelerates globally, the importance of cybersecurity measures and data safeguarding grows exponentially.

The global cyber domain increases organisations' and individuals' connectedness, but it also makes them more vulnerable to cyberthreats. 2020 saw an increase in cyberattacks' probability and severity as hackers tried to capitalise on the coronavirus (COVID-19) outbreak. The epidemic, the rise in remote work, 5G, ransomware, and most notably the significant data breach at the psychotherapy centre Vastaamo in Finland spurred a public conversation about information security issues. Information security violations and threat notifications increased significantly in 2020 compared to the previous year, reaching a total of about 12,000.

Types of cyber attack

In Finland, there have been fewer serious information security breaches and threats even though 2020 was a challenging year for cyber security. Telecommunications companies reported five significant breaches of information security in that year. In Finland, phishing and online frauds accounted for the bulk of threat cases and information security violations; this trend rose especially in the first half of 2020. Malware infections accounted for roughly 47,000 of the major events recorded in the final quarter of 2020. The majority of harmful software that was detected was unidentified scanning malware, and this percentage

[17] J. Clausnitzer, Feb 22, 2024 https://www.statista.com/topics/7701/cyber-security-in-finland/#topicOverview

rose as remote work grew. Over 10% of all malware attacks on internet-connected smart devices (IoT) were caused by Qsnatch and Mirai.

Attack trends in Finnish companies

Companies are increasingly being targeted by cybercriminals, which makes cybercrime a serious threat to them. Cyberattacks can come in many different forms, including malware, phishing, data breaches, information leaks, and dangerous spam emails intended to trick clients and staff. According to a 2019 survey, nearly two thirds of Finnish businesses saw malware and phishing assaults as the biggest cyber security risk to their operations. Denial-of-service (DoS) assaults, internal system intrusions, and information breaches were among the other main internet dangers facing Finnish businesses. Finland's businesses have identified user carelessness and a lack of knowledge about potential dangers as the primary obstacles to their successful adoption of cybersecurity. Additionally, eighty percent of major corporations claimed that the decentralised model of operation had raised dangers related to information and cyber security in 2020.

Awareness and prevention of cybercrime

In general, cybercrime can be avoided with increased knowledge of the risks associated with using the internet. About 50% of Finns surveyed in 2019 claimed to be reasonably knowledgeable about the dangers of cybercrime. Most Finns were optimistic that they could adequately protect themselves against cybercrime, even though 91% of respondents to the same survey believed that the likelihood of becoming a victim of cybercrime was rising. Avoiding opening emails from senders they don't recognize was the most popular precaution taken by Finns to increase their internet security. In 2019, 53% of people had antivirus software installed, and most of them also used cybersecurity apps or software on their smartphones.

Key sights

No of information security incidents	**1,145,377**
Share of companies who consider cyber security risks significant	**87%**

2.8 CYBERSECURITY IN GERMANY [18]

The term "cybersecurity" denotes protection measures for digital systems like computers. While a relatively modern criminal domain, cybercrime prevalence escalates alongside society's growing dependence on electronic infrastructure. COVID-19 lockdowns forced millions into remote work, dramatically expanding online systems and necessitating enhanced corporate security protocols. Inadequate system protection exposes organizations to substantial financial damages.

Regulatory Framework: EU GDPR: Germany adheres to the strict General Data Protection Regulation (GDPR) mandating organizational data protection standards.IT Security Act 2.0 (IT-SiG 2.0): Enacted in 2021, this legislation strengthens IT defenses against modern threats like ransomware, while amending the BSIG to expand the Federal Office for Information Security's (BSI) authority over risk evaluations and governmental security benchmarks. BSI: Germany's central cybersecurity agency oversees preventive digital security and critical infrastructure protection.

Types of cybercrime

With the increasing amount of data being kept online, hackers have discovered new ways to interrupt operations or, in more nefarious instances, demand ransom from businesses. Phishing assaults were the most frequent kind of attacks against IT systems in Germany. These most frequently take the shape of emails that ask recipients to divulge personal information. The hacker then sells or uses this information for other malevolent reasons. Another common kind of cyberattack is malware, which is used to infect computers and can result in a number of issues like blocked file access, unusable devices, or even an abundance of advertisements on the desktop.

Another frequent attack that hackers carry out, usually against businesses or institutions, is data theft. Customer information and communications data (messages and emails) were the most often stolen categories of data in 2023. These kinds of attacks frequently encrypt the data and demand a ransom before unlocking it. There are instances where patient data theft and encryption occur in hospitals, for example, where the results can be lethal.

Improving cyber safety:-

Technology will undoubtedly dominate future developments, making cybersecurity enhancements costly but essential for protecting user information. In Germany, the average cost of a cyberattack is approximately 16,000 euros. While this represents a decrease from prior years, it is still a substantial sum of money that businesses must incur. Purchasing cyber insurance can help shield a business from cyberattacks by paying for losses that occur from any type of online hacking or assault. Nearly half of German businesses allocated between 10 and 20 percent of their IT budget on IT security in 2023.

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[18] Statista Research Department, Mar 18, 2024 https://www.statista.com/topics/10499/cyber-security-in-germany/#topicOverview

There is general agreement that cyber security needs to be strengthened, particularly in Germany, despite the apparent delayed uptake of financial protection. In a study on the subject, nearly all participants concluded that tougher measures should be implemented to combat foreign cyberattacks and that politicians should aggressively encourage security cooperation within the EU.

Key insights

No of cybercrime cases recorded by the police	**136,865**
Financial damage from cybercrimes	**205.9bn EUR**
companies at higher risk of cyber attack	**50%**

2.9 CYBERCRIME IN INDONESIA [19]

Cybercrime in Indonesia's banking sector is a serious and growing risk, threatening both financial organisations and their consumers. Indonesia, with its vast and growing online population, has been a popular target for hackers.

As more companies and customers move into the digital sphere, Indonesia has seen enormous growth in the last ten years. The digital landscape has transformed through growing dependence on online technologies and communication systems, creating unprecedented convenience and possibilities. However, without robust cybersecurity measures to facilitate the continuous advancement and adoption of digital solutions, vulnerabilities emerge that malicious actors may exploit. Indonesia faces increasingly organized and severe cybersecurity threats that endanger national security, businesses, and individual citizens. The country detected approximately one billion suspicious activities indicating potential cyberattacks during 2022, highlighting the urgent need for protective measures to secure digital infrastructure.

Digital opportunities and potential calamities :-

With its exponential rise in recent years, Indonesia has the largest digital economy in Southeast Asia when compared to its counterparts. By fostering and leveraging indigenous talents, the nation has made tremendous progress towards digitization, leading to the creation of multiple domestic tech firms and the multibillion-dollar tech company Go-To. As a result, international technology businesses now see Indonesia to be an even more desirable place to invest, which helps to accelerate the country's digital economy's growth. But these technological advantages have also given rise to possible digital disasters in Indonesia. They increase the risks facing the nation and create vulnerabilities as a result of insufficient cybersecurity defences.

For now, the cases of phishing and data breaches are very rampant in Indonesia. The internet data breaches in 2022 were estimated at almost 15 million, but they only added more queries about the nation’s data

[19] Hanadian Nurhayati-Wolff, Dec 12, 2023 https://www.statista.com/topics/11732/cybersecurity-and-cybercrime-in-indonesia/#topicOverview

protection. Indonesia has failed to respond to the fundamental cybersecurity demands; Hence, the nation becomes vulnerable to attack Being since there are few cybersecurity personnel needed to counter the said dangers, and the public is ignorant of the real cyber threats. With a mere 63. With a National Cyber Security Index (NCSI) score of 64, Indonesia continues to face difficulties in implementing effective prevention and response measures against cyber threats. This challenge is further reflected in the country's modest cybersecurity market revenues, despite currently holding the sixth position in the Asia-Pacific region.

Companies' readiness for cyber resilience:-

In Indonesia, digitization has also accelerated due in large part to the COVID-19 pandemic, particularly among businesses. The health issue not only pushed businesses to go online, but it also popularised the idea of working from home. As a result, following the epidemic, remote workforces and hybrid workplace models have become increasingly common. Cybersecurity issues for businesses today extend beyond asset protection. Additionally, they must safely connect several devices in various places from various networks within the company, which, if done incorrectly, might create potential threats.

Companies now need to be more cautious against new and quickly developing cyber dangers due to the adoption of the new hybrid workplace model and other technological improvements. In order to establish cyber resilience and safeguard their assets, proper cybersecurity solution deployment is necessaryCurrently, just 39% of Indonesian enterprises have reached full cybersecurity readiness maturity, indicating significant progress remains necessary to achieve true cyber resilience.

Key insights

Ranking in the cybersecurity market	**6th**
Share of business with a cyber incident	**52%**
National Cybersecurity Index ranking	**63.64**

2.10 CYBERSECURITY IN ISRAEL [20]

Israel has gained technical prowess in cybersecurity in recent decades, making it a vital sector of the Israeli economy. In a time of cyberwarfare and cybercrime, there is a great need for specialists in this area. IVC Research Centre reports that there were 23 cybersecurity company departures from Tel Aviv in 2021. Within the city's high-tech sector, this industry saw the most number of exits that year. Certain exit transactions, such as high-value M&A and buts, are noteworthy. Israeli cybersecurity firms provide a range of defences against various online dangers, with a focus on data security. According to estimates, the nation's cyber security income will rise steadily to $1.43 billion by 2028.

Cybercrime is a major concern :-

[20] Eyal Lichter Dec 21, 2023 https://www.statista.com/topics/10918/cybersecurity-in-israel/#topicOverview

Like many other nations, Israel frequently deals with a variety of cybercrimes. Information theft or the unauthorised use or dissemination of data was the most prevalent kind of cybercrime in 2021, according to a government report. Online sexual harassment and personal threats also exist. These kinds of crimes use social media as a forum. Men and women are nearly equally the targets of cybercrimes when looking at the identities of cybervictims. An additional Israeli poll found that 6.9% of cybercrime instances in Israel included men. It was somewhat greater than the six percent female cybercrime victim share.

A high number of cybersecurity companies :-

There are a lot of cybersecurity businesses in Israel. There were 469 cybersecurity companies operating in Israel in 2021. Over the past ten years, the number of businesses in this industry has steadily expanded. In terms of growth, 2022 was a difficult year for the Israeli high-tech industry. In fact, less investments were made in local cybersecurity startups annually in 2022—99—than the previous year. On the other hand, the quantity of investments has progressively increased since 2015. Checkpoint is the most prosperous cyber security business in Israel. The business is well-known for creating firewalls, VPNs, and other cutting-edge cybersecurity products. The amount of money invested in regional cybersecurity firms in 2021 was 2.2 billion USD. When compared to the prior year, this represented a rise.

Key insights

Revenue of the cybersecurity market	**880m USD**
Average spends per employee in the cybersecurity industry	**208.3 USD**
Value of investment in cybersecurity companies	**3.5bn USD**

2.11 CYBERSECURITY IN ITALY [21]

In today's technology-driven society, where digital tools are essential for both work and leisure, securing our everyday devices and online services has become critically important. Cybersecurity (also referred to as information technology protection) involves defending computer networks and digital information from internet-based threats. As global digital interconnection expands, so does the risk that malicious hackers may compromise personal or corporate data and systems. Italy exemplifies this trend, having experienced a significant surge in cyberattacks across multiple sectors in recent years, particularly targeting government institutions and ICT (information and communications technology) infrastructure.

[21] Statista Research Department, Jan 10, 2024 https://www.statista.com/topics/4102/cybersecurity-in-italy/#topicOverview

Many different cyber attacks

A cybercrime is a malicious effort made to corrupt, manipulate, or even steal data in a computer, and even to exploit a network. Cyber-attacks are of many types; two of which are malware and ransomware cyber-attacks. Cyber espionage, cyber warfare, hacktivism and the large-scale cyber attack's called distribution denial of services (DDoS) are other subcategories under cyber exploitation. New pattern of DDoS attacks show that the situation has worsened over the last five years.

The Italian cybersecurity market :-

IT security solutions, which aid in preventing unauthorised access to data, are used by individuals and businesses to fend off cyberattacks and safeguard their digital assets. Over the past few years, Italy's cybersecurity market has grown steadily, and in 2022, The market is projected to grow to nearly two billion euros, with cloud and SMS services constituting the dominant segment at approximately 655 million euros during that period.

IT security solutions:-

Italy's cybersecurity solutions encompass IAM (Identity and Access Management), vulnerability assessment, risk and compliance management, along with Security Information and Event Management (SIEM) and vulnerability management. Security infrastructures additionally utilize big data analytics, cloud computing, artificial intelligence (AI), and machine learning (ML) to identify network anomalies and detect emerging threats..

Key insights

Cybersecurity market size in Italy	**1.85bn EUR**
IT service ASPE 2023	**41.6 EUR**

2.11 CYBERCRIME IN JAPAN [22]

In contemporary Japan, where digital technologies play a crucial role in cashless transactions, telehealth services, and remote work, cybersecurity issues have gained substantial prominence. The growing economic and social importance of digital capabilities has highlighted cybercrime concerns, with 2019 data showing online banking fraud cases causing financial losses exceeding 2.5 billion yen. The death of a female professional wrestler known as Hana Kimura as well as a cast member on a reality TV show in June 2020 proceeded to advance cyberbullying to a large social issue. The police said that the numbers of ransomware attacks targeting businesses increased in both 2021 and 2022. That is why, based on the analysis of resolved cases of cybercrime, such offences are distinguished: swindle, violation of the law

[22] Statista Research Department, Dec 19, 2023 https://www.statista.com/topics/5186/cyber-crime-in-japan/#topicOverview

against the production, distribution, purchase, sale, exhibition, transfer, or possession of child pornography and prostitution and cyber terrorism against computers or electromagnetic records.

Growing problem awareness Japan's growing focus on cybersecurity stems from its internet-dependent economy, advanced electronics sector, automation technologies, geopolitical position, and strained regional relations. While Japanese policymakers initially responded slowly to these threats, the nation has since implemented measures to strengthen its cyber defenses. The 2020 Tokyo Olympics and the "Society 5.0" digital transformation initiative provided strong motivation to enhance protection against domestic and foreign cyber threats. The 2018 revisions to the Telecommunications Business Act introduced key changes, authorizing NICT to perform active monitoring of IoT networks to mitigate DDoS threats. In 2022, Japan's National Police Agency also formed a specialized unit focused exclusively on cybercrime investigations.

Information security measures While law enforcement has achieved greater success in solving cybercrime incidents,businesses and private citizens do not only depend solely on government agencies to protect them from cyberattacks. A survey conducted among Japanese organisations revealed that nearly all of them have put information security measures in place to fend off cyber attacks. The poll also revealed that the most popular information security strategy used by businesses was the installation of antivirus software on PCs and other devices. Tools and services that promise to enhance information security have become essential due to the growing dependence on the internet, not just for corporations but also for many individuals using personal devices to access the internet. This is particularly true given how widespread cell phones have become in the 2010s.

Key insights

Number of cleared cybercrime cases	**12.4k**
The leading type of cleared cyber crime	**Fraud**

2.12 CYBERCRIME AND CYBERSECURITY IN POLAND [23]

Polish internet users most commonly encounter spam, hate speech, and digital piracy as their primary online concerns.. According to the network risks map, objectionable and unlawful content is the most frequent issue facing Polish Internet users. This group contains copyright-violating content, spam, and illegal stuff (such paedophilia). Regretfully, the scope of risks brought about by the internet is expanding annually, and this pattern is certain to persist.

[23] Adriana Sas Dec 21, 2023 https://www.statista.com/topics/5582/cyber-crime-and-cyber-security-in-poland/#topicOverview

Cyber attacks :-

The majority of cyberattacks that were recorded in Poland involved malware, such as trojan horses, rootkits, viruses, and dialers. An email purporting to be an invoice, notification, or document from a reputable organisation that contained text files or an internet address for downloading malware was an often seen attack. Hackers knowingly employed a variety of software programmes, including ransomware and malware known as "bankers," which targets users of online and mobile banking. Numerous well-planned, coordinated, and targeted campaigns have led to this concerning consequence. One of the most common ones involved sending phoney bills via email links or risky attachments.

The quantity of phishing websites remained extremely high in 2022. Two kinds of frauds were the most common among the thieves. Phishing on Facebook was the first one. This technique is based on pretending to be the owner of a Facebook account and requesting a transfer via the BLIK mobile payment system in private messages to those who have been added to the account's "friends" list. Phishing attacks involving spoof websites for international services, such PayU and DotPay, were reported as the second most frequently. The second well-known phishing attempt was a spoof of PayU and the quick payment provider DotPay.

Cybercrime in business:-

In its broadest sense, cybercrime poses a serious risk to businesses. A genuine threat to corporate security, according to the majority of companies, is dissatisfied or bribed personnel, organised cybercrime gangs, and cyber terrorists. Is there a way to effectively defend against cyberattacks? In both the public and private sectors, cybersecurity concerns about terminal equipment—that is, smartphones, tablets, laptops, desktop computers, printers, and multifunction printers—need significant funding and training. In the upcoming years, businesses will face the difficulty of providing sufficient cyber protection for their operations and educating staff members on the responsible use of terminal equipment while carrying out their jobs.

Key insights

Value of cyber security market	**2.5bn PLN**
Forecast of the cyber security market revenue	**1.16bn USD**
Leaders in cyber security	**Bank**

2.13 CYBERCRIME IN RUSSIA [24]

Russia remains the world's leading origin of phishing attacks, generating more than 30% of global spam emails in 2023. On January 16, 2023 alone, Russian-originated spam emails reached 7.03 billion, placing

[24] Statista Research Department, Apr 18, 2024 https://www.statista.com/topics/7335/information-security-and-cyber-crime-in-russia/#topicOverview

the country fifth worldwide for spam volume. Meanwhile, domestic cybercrimes targeting Russian users - including malware infections, data breaches, and online fraud - have shown significant growth. Industry experts project that Russian consumer spending on cybersecurity solutions will grow to 132 billion rubles by 2025.

State of cybercrime in Russia:

Russian cybersecurity statistics reveal that approximately 20% of personal computers encountered malware infections annually, while 10% fell victim to phishing attempts. The most common consequence of data breaches involved compromised personal information, encompassing names, email and physical addresses, along with individual insurance policy details. Additionally, sensitive state and corporate confidential information was frequently exposed. In 2023, Russia ranked second globally in compromised online accounts, with over 78 million affected users, surpassed only by the US.

Kaspersky Lab, Russia's leading cybersecurity firm headquartered in Moscow, delivers global antivirus and endpoint protection services, achieving over $752 million in worldwide revenue during 2022. Softline, another major Russian IT enterprise established in Moscow, offers comprehensive digital services including diverse cybersecurity solutions**,** and is active in Eastern Europe, the Americas, and Asia, is the second-highest earning company. The Citadel firm group, the biggest manufacturer of legal interception equipment in the nation, comes in second.

Since the Feb 2022 invasion of Ukraine Russian state authorities themselves reported an increase in cyber attacks on them. From 2025, public institutions of the United States were banned from importing a new generation of security software for critical infrastructures. Two web security companies which left the Russian market are Avast and DigiCert. Also, Kaspersky Lab joined the list of businesses that the Federal Communications Commission (FCC) in the United States concluded could be dangerous to the country's security in March 2022. More users have shown concern regarding VPN solutions because of the Russian government's actions aimed at Facebook and Instagram. This work describes the growth of the domestic business due to the growing number of Russian users experiencing data leaks and mass foreign providers of information security products withdrawing from the country.

Key insights

Cybersecurity market size in Russia	**3.56bn USD**
Quarterly number of information security incidents.	**473k**

2.14 CYBERSECURITY IN SOUTH KOREA [25]

The ongoing digital transformation and adoption of emerging technologies have made the internet ubiquitous, significantly expanding cyberattack risks for both individuals and businesses. The COVID-19 crisis accelerated this shift toward digital platforms, particularly affecting mobile banking, e-commerce, virtual education, and e-government servicesTo address the pandemic's financial consequences and facilitate digital transformation, South Korea's Ministry of Science and ICT launched the Korean Digital New Deal in June 2020, emphasizing web-based technological innovations. Prior to this initiative's introduction, the nation had already witnessed escalating vulnerabilities to cyber risks including data breaches, ransomware attacks, and multiple forms of IT security breaches.

Cybersecurity industry:-

The South Korean government increased research and development spending in the information security sector in compliance with the Digital New Deal. They also have plans to provide more capacity for the information security staff, which is already expanding. The cybersecurity industry has demonstrated independent growth, with revenues expanding proportionally to increasing security demands. While physical security products - including surveillance systems, biometric devices, and automated electronic security - remain dominant in sales, digital information security solutions have also shown significant market expansion..

The most common type of cyber attacks:-

Malware remained the predominant tool in online hacking incidents despite a previous decline in malicious websites before their 2022 resurgence. These harmful platforms aim to distribute damaging code or infect devices. Malware encompasses all detrimental programming, including viruses and Trojans, capable of compromising operating systems or exposing sensitive data. Although malware attacks represented the most common corporate IT security violations, data breaches were considered the most severe cyber threats.

New security risks:-

The Digital New Deal adopted a DNA (Digital, Network, AI)-focused strategy to advance South Korea's cybersecurity industry and supporting infrastructure. This approach involves implementing artificial intelligence and 5G networks across both public institutions and private enterprises. The plan also calls for the creation and implementation of digital management systems for smart city infrastructure, healthcare, and education. All of this is meant to facilitate access and boost economic growth, but it also increases the possibility of widespread cyberattacks, particularly concerning more recent technology like artificial intelligence. Thus, it is unclear how these novel dangers will be handled.

[25] Nina Jobst Jan 19, 2024 https://www.statista.com/topics/9530/cyber-security-in-south-korea/#topicOverview

4 **Key insights**

Total cyber information security sales	**5.6tr KRW**
Average cost of data breaches	**2.79m USD**

2.15 Conclusion:

Based on the overview of the global legal perspective on cybercrime, it is noted that there are many emergent legal questions that have developed from cyberspace, which is a territory-less domain for many of the acts but despite this, there have been attempts made by some countries to enact laws pertaining to the internet and cyberspace. The Information Technology Act, 2000, though positioned as India's comprehensive legislation for cybercrime prevention and control, frequently proves inadequate and irrelevant in practical applications. Current laws fail to clearly define the legal standing of digital transactions or establish civil liabilities for online activities, primarily due to insufficient international regulations addressing these critical issues.

3 Chapter 3: Analysis of Cybercrime in the banking sector and its legal provisions in India

3.1 Introduction

India faces growing economic and social vulnerabilities as cybercrime has risen dramatically in recent years. The country's expanding digital landscape and widespread internet adoption have created more opportunities for criminals to exploit security gaps and conduct illegal activities. This analysis explores cybercrime's substantial impacts on India's economy and population while emphasizing the critical requirement for effective countermeasures.

As one of the world's largest digital markets, India has experienced considerable financial damage from cyber incidents.These occurrences are directed toward people, companies, and financial institutions, resulting in immediate financial losses and a decline in customer confidence. Cyberattacks also interfere

with corporate activities, which is very detrimental to Indian firms. They stifle productivity, damage supply chains, and paralyze vital infrastructure, all of which obstruct economic growth and progress.

3.2 An overview of cybercrime in the banking sector[26]

Cybercrimes encompass illegal activities conducted via the internet or computer systems. Essentially, these digital offenses involve unauthorized access through electronic devices and online networks to commit unlawful acts.In today's globalized environment, banks provide diverse services like credit facilities and online banking. Customers enjoy round-the-clock access to financial services through internet and mobile platforms, irrespective of location. While these digital conveniences offer significant benefits, they simultaneously create vulnerabilities to malicious activities like hacking and phishing schemes.

3.3 Provisions of cybercrime under the Indian legal scenario. [27]

Key provisions of the Information Technology Act, 2000, addressing banking sector cybercrimes The IT Act, 2000, was enacted to regulate digital transactions and counter cyber offenses in India. Several of its sections directly apply to digital crimes affecting financial institutions, with specific relevance to banking operations. The main clauses of the IT Act of 2000 that apply to cybercrimes in the banking industry are listed below:

1. **Section 43**: Compensation and Penalties for Computer, Computer System, etc. Damage. This part, which addresses data theft, unauthorised access, and system damage, is crucial. Application to banks: Section 43 violations occur when cybercriminals infiltrate banking systems to transfer funds illegally, compromise customer information, or disrupt operations. Affected parties, including financial institutions or account holders, can seek financial compensation for such breaches.

2.Section 43A: Restitution for Noncompliance with Data Protection Companies or organisations (including banks) that handle sensitive personal data are especially covered by this section.

Important point: A bank (as a body corporate) is responsible for compensating the impacted party if it fails to implement reasonable security standards and this results in unlawful loss or gain.

[26] An overview of cybercrime in the banking sector https://www.legalserviceindia.com/legal/article-7694-an-overview-of-cyber-crimes-in-banking-sector.html(09/2024)

[27] Punishment for cybercrime under Indian constitution https://www.freelaw.in/legalarticles/Punishments-for-Cyber-Crime-Under-Indian-Constitution#:~:text=Section%20500%3A%20It%20states%20that,dealt%20with%20as%20per%20the(06/2024)

Relevance to banks: Banks hold vast amounts of private and sensitive financial information. Under this provision, liability may result from any careless data breach or leak (such as from inadequate encryption or insecure APIs).

3. **Section 66**: Offences Associated with Computers (Criminal Liability)
4. The criminal equivalent of Section 43 is this.A crucial clauseAny act specified in Section 43 that is carried out dishonestly or fraudulently is considered a criminal crime and is punishable by up to three years in prison and/or a fine of up to ₹5 lakh.Application to bank:Section 66 would apply to hacking into a bank's system to steal data or move money unlawfully.

5. **Section 66C:**

   Theft of Identity

   Using someone else's password, digital signature, or biometric information dishonestly or fraudulently is covered in this section.

   Relevance to banks:

   In order to carry out illegal operations, cybercriminals frequently steal login passwords for online banks. Under this clause, such behaviour is punishable by up to three years in prison and a fine of up to one lakh rupees.

6. **Computer-Based Identity Fraud (Section 66D)** Encompasses Online phishing schemes, fraudulent web platforms, and SMS/email impersonation designed to deceive individuals for financial gain.

   Banking Implications: Criminals commonly mimic bank representatives or create counterfeit banking portals to defraud customers. These offenses are punishable by up to three years imprisonment and fines reaching one lakh rupees.

7. **Section 72A:** Information Disclosure in Contract Violations Goals:

   disclosure of personal data for profit or malicious purposes by intermediaries or service providers without authorisation.

   Application to banks: This clause penalises third-party vendors who handle consumer data (for example, credit card processing) if they reveal it without consent.

Bharatiya Nyaya Sanhita (BNS), 2023[28]:

1. **Section 111 (Organized Crime)** This provision defines organized crime as ongoing illegal operations encompassing "economic offenses" and "cybercrimes" conducted for the benefit of criminal organizations. Clause (g) specifies that "economic offense" refers to fraudulent activities targeting banking institutions and financial entities. Penalties for organized crime range from a minimum five-year imprisonment to life sentence, plus fines exceeding five lakh rupees. Cases resulting in fatalities may receive capital punishment or alternatively life imprisonment with fines surpassing ten lakh rupees. These measures particularly apply to large-scale, coordinated cyber fraud schemes against banks involving multiple perpetrators**.**
2. **Section 316 (Criminal Breach of Trust):** This provision addresses the unlawful misappropriation or diversion of movable assets through deceptive means. Regarding bank-related cyber offenses, it applies when staff members or authorized personnel improperly exploit their access to digital funds or resources. The prescribed punishment includes imprisonment up to three years, monetary penalties, or both.
3. **Section 318 (Cheating):** This provision addresses situations where an individual deceives another to fraudulently obtain property, secure consent for its retention, or manipulate actions through false pretenses. It specifically covers online banking frauds including phishing, vishing, and similar social engineering schemes that trick customers into revealing sensitive information or authorizing transactions. Offenders face imprisonment of up to three years and/or monetary penalties, with more severe cases warranting sentences extending to five years.
4. **Section 303 (Theft):** This provision characterizes theft as the dishonest removal of movable property without the owner's authorization. Applied to digital contexts, it encompasses illicit transfers of funds or information from banking networks or client accounts. Violations may result in penalties reaching three years' incarceration, financial sanctions, or a combination thereof.
5. **Sections on Forgery (e.g., Section 336**): These provisions address creating counterfeit documents or manipulated digital records intended to mislead. Such offenses encompass fabricating fake online banking interfaces, processing unauthorized electronic payments, or altering financial data systems. Penalties differ based on the specific violation and forgery method employed.

The Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023 serves as India's updated criminal procedural framework. While the Bharatiya Nyaya Sanhita (BNS) specifies criminal offenses, the BNSS outlines the

[28] Punishment for cybercrime under Indian constitution https://www.freelaw.in/legalarticles/Punishments-for-Cyber-Crime-Under-Indian-Constitution#:~:text=Section%20500%3A%20It%20states%20that,dealt%20with%20as%20per%20the(06/2024)

processes for crime investigation, legal prosecution, and judicial proceedings, encompassing cyber-related offenses.

The following are the main, pertinent BNSS provisions:

1. **Section 105:** Utilising Electronic Proof. Digital evidence and electronic records are officially recognised by BNSS. This includes logs, transaction records, emails, CCTV footage, SMS/OTP data, and more. For electronic evidence to be admitted in court, it must be gathered and stored in accordance with established guidelines. Relevance to banks: Digital transaction logs, IP addresses, mobile device records, etc., are important pieces of evidence that are admissible under this section in cases of fraud (such as phishing and UPI scams).
2. **Section 132: Electronic** Communication for Police Action Police can use electronic communication to issue warrants, notices, and summonses. expedites the investigation of rapidly evolving cyber fraud cases.Relevance to banking: Police can take swift action in situations of identity theft or phishing by notifying banks, telecom companies, or digital wallets via digital notices.
3. **Section 185:** Evidence Preservation and Protection. Digital evidence must be stored in a manner that preserves its chain of custody and integrity, according to BNSS regulations.Relevance to banking:crucial for maintaining transaction histories, server logs, and bank logs for a successful prosecution.
4. **Section 254:** Timelines for Fast-Track Investigations Faster trials with set time restrictions are encouraged by BNSS for some investigations, particularly those involving technologically complicated offences.Relevance to banking:Money laundering and quick money transfers are common components of cyber frauds. A prompt investigation aids in speedy justice and fund recovery.
5. **Section 180:** Digital Device Search and Seizure permits the search of digital wallets, servers, mobile devices, and PCs.specifies how to confiscate digital evidence, such as hard discs and gadgets used in bank fraud.Relevance to banking: Under the law, police have the authority to confiscate systems used in fraudulent transactions or illegal ATM access.
6. **Section 185:** Evidence Preservation and Protection

   Digital evidence must be stored in a manner that preserves its chain of custody and integrity, according to BNSS regulations.Relevance to banking:crucial for maintaining transaction histories, server logs, and bank logs for a successful prosecution.

The Digital Personal Data Protection Act (DPDP Act), 2023[29], is a significant piece of Indian law that sets guidelines for protecting people's privacy and regulates the processing of digital personal data. Even though it doesn't define cybercrimes specifically, the Act is essential for protecting financial and personal information, particularly in industries that use a lot of data, like banking.

1. **Section 8** Security Protocol Requirements: Financial institutions and data custodians must: Implement comprehensive organizational and technical protections to prevent security incidents. Promptly inform affected customers and the Data Protection Board about any breaches. Banking Implications: Cyber incidents leading to fraudulent activities (like account compromises or illegal transactions) constitute serious regulatory violations for banks.

2. **Section 9:** Data Breach Reporting Obligations: Financial institutions must report all personal data breaches to India's Data Protection Board and affected customers.Banking Sector Relevance: Institutions face mandatory disclosure requirements and potential penalties when security breaches compromise numerous client accounts.
3. **Section 10** - Personal Data Processing: This part specifies the principles governing personal data processing, such as the necessity for authorised reasons and fair and transparent processing. In the context of cybercrime, criminal actors' unauthorised access or processing of client data would constitute a violation of these standards. Banks must ensure that their data processing activities are safe and protected from unauthorised modification.
4. **Section 11** - Purpose Restriction Clause: This provision mandates that personal information may only be utilized for the data principal's consented purposes or other legally authorized applications.. Cybercriminals frequently intend to utilise stolen data for reasons other than the original objective (for example, fraud or identity theft). Banks must have security procedures in place to avoid the misuse of data obtained through a cyberattack and financial repercussions if cybercriminals take advantage of lax security in bank systems to commit fraud or theft.

5. **Section 12** - Data Minimisation: Data fiduciaries must collect only the personal data required for the specified purpose. By adhering to this approach, banks can reduce the quantity of sensitive information that could be disclosed or compromised in a cyber incident.

6. **Section 13** - Data Retention: This provision requires that personal data be retained for no longer than is required to meet the purpose for which it was gathered. Banks should have protocols in place to securely delete or anonymise data that is no longer required, lowering the likelihood that it could be targeted in future cyberattacks.

[29] Punishment for cybercrime under Indian constitution https://www.freelaw.in/legalarticles/Punishments-for-Cyber-Crime-Under-Indian-Constitution#:~:text=Section%20500%3A%20It%20states%20that,dealt%20with%20as%20per%20the(06/2024)

3.4 India's cybersecurity challenges: threats and strategies[30] DPDP Act's Principal Cybersecurity Issues for Banks:-

1. Insufficient Infrastructure for Cybersecurity

Many banks still use antiquated IT systems, particularly cooperative and rural banks. These systems: Do not have firewalls, encryption, or frequent vulnerability patching. unable to recognise and respond to sophisticated threats.

DPDP Implementation Hurdle: Financial institutions struggle to establish the "appropriate security measures" mandated by Section 8 of the legislation.

2. A Higher Chance of Data Breach

Account numbers, PANs, Aadhaar, credit ratings, mobile numbers, and other sensitive personal information are all stored in large quantities by banks.Risk of cybercrime:Phishing, identity theft, illegal activities, and digital loan fraud can all result from a breach.The DPDP Challenge

According to the Act, a breach of this kind can lead to fines of up to ₹250 crore and requires mandatory breach notification.

3. Vulnerabilities of Third Parties (Cloud Providers, Vendors, Fintech) For payment processing, KYC, cloud storage, and customer onboarding, banks are depending more and more on outside tech companies. The DPDP Challenge Banks are nonetheless responsible for data under Sections 5 and 9, even if a third party handles it improperly. This implies that banks need to implement stringent data-sharing policies. must keep an eye on the cybersecurity standards of providers. However, oversight and enforcement are frequently ineffective or uneven.

4. Insufficiently Skilled Cybersecurity Experts: Cybersecurity specialists are in short supply at banks, especially smaller ones. Teams that respond to incidents and data protection officers (DPOs)DPDP Challenge: The Act assumes that data fiduciaries, such as banks, are capable of creating and enforcing intricate incident response and data governance systems, which may not be feasible for everyone.

5. Attacks Using Social Engineering and Phishing Cybercriminals commonly make use of:SMS frauds claiming that "Your account is blocked"Phony banking websites or applications posing as bank representativesCustomers unintentionally divulge credentials as a result of these. DPDP Challenge: Banks may be held accountable for failing to protect personal data if such assaults are successful because of a lack of client awareness or a communication security flaw.

6. Data Storage & Transfer Across Borders: Banks that use foreign cloud service providers, such as AWS and Azure, must deal with ambiguity because DPDP only permits cross-border data transfers to authorised nations. An official whitelist has not yet been released by the government. The DPDP Challenge: Legal danger arises from data localisation ambiguity if client data is accessed or maintained in unapproved areas.

[30] https://www.drishtiias.com/daily-updates/daily-news-editorials/india-s-cybersecurity-challenge-threats-and-strategies#:~:text=What%20are%20the%20Challenges%20Posed,public%20safety%20and%20national%20security.

India's Cyber Attack Vulnerability[31]: India's banking industry's digital transition, improving financial inclusion but also making it more vulnerable to cyberattacks. Indian banks are particularly vulnerable to cyberattacks due to the combination of legacy infrastructure, growing digital transactions, and a lack of cybersecurity knowledgeAs per the survey, in 2022, more than 759 million people at least once a month were active on the internet out of the total population of India, it shows the large and developing internet population of India. As for the Internet market or e-commerce, India arrives as the second-largest market after China. It is assumed that by 2025 there will be 900 million persons diagnosed with a non-communicable disease. India digital economy is growing at great pace and most of the sectors of the country are hooked online with services like Heath care, Education, banking sectors, retail, Agriculture etc.

However, because of poor and inadequate cyber security policies and infrastructures, and minimal awareness, hackers can always exploit system vulnerabilities in India. Thus, the country faces systematic challenges from the advanced cyber threats that may originate from state and non-state actors targeted on intervention in the Indian strategic, economic, and political interests. Initiatives like Digital India, UPI, and Jan Dhan Yojana have accelerated.

Major Areas of Vulnerability in Indian Banking:-

1. Banks in the Public Sector with Legacy IT Systems. Numerous public sector banks still use antiquated core banking systems that are susceptible to ransomware, malware, and denial-of-service (DoS) assaults. They provide hackers with easy access points because of patching delays and a lack of real-time monitoring. For instance, malware attacks on ATMs are brought on by antiquated software and inadequate firewalls.
2. Growth in Fintech Dependency and Digital Payments: Digital banking services, mobile wallets, and UPI have all grown rapidly. These days, banks mainly rely on fintech platforms from third parties, which may not have sufficient cybersecurity protections. Risk: The entire customer data flow could be at risk if one link, such as an API or digital loan aggregator, is compromised.
3. Users' Lack of Cyber Awareness:Phishing, vishing (voice phishing), and SMS scams affect a lot of Indian consumers.To get login credentials and OTPs, scammers pose as bank employees or build phoney banking websites.Result: Social engineering and human mistake continue to be significant danger vectors in spite of robust banking infrastructure.

Recent Banking Cyber Incident Examples in India:-

In 2020, Canara Bank to an exposed server, private financial information was leaked.

[31] Assessing vulnerabilities in the Indian banking sector https://www.pwc.in/research-and-insights-hub/assessing-vulnerabilities-in-the-indian-banking-sector.html(08/2024)

In 2018, Cosmos Bank impacted about 10 lakh clients.A malware attack on an ATM compromised 94 crore rupees.SBI in 2021 (via partner)Unsecured server data leak: More than 3 million documents made public .In 2023, numerous cooperative banks were scammed using malware and phishing, and money was embezzled from rural accounts. According to a recent CloudSEK analysis, cybercrime might cost India ₹20,000 crore by 2025. The banking and financial services sector is particularly vulnerable, with a potential loss of ₹8,200 crore. These figures reveal the expanding magnitude of the issue. Finance Ministry reports indicate a 400% surge in major cyber fraud incidents (₹100,000+ transactions) during FY2024, causing financial damages exceeding $20 million (₹177 crore). Reported cases jumped from 6,699 to 29,082 year-over-year.

The Challenges Indian Banking sectors Face from Cyberattacks[32] :-

1.Many institutions utilise outdated IT systems that are prone to viruses and ransomware.

2.Rising digital transactions, like UPI and mobile banking, increase the danger of cyber fraud and data leakage.

3.Phishing and social engineering sometimes include tricking customers into revealing OTPs and financial credentials.

4.Third-Party and Fintech Risks: Inadequate cybersecurity in partner platforms might expose customer data.

5.Misconfigured cloud storage can result in large-scale data breaches.

6.Low cyber awareness among users and staff can lead to increased fraud risk.

7.Underreporting of incidents can compound the damage, as some banks delay or avoid reporting breaches.

8.Cross-border Threats: International cybercriminal networks and advanced persistent threats (APTs) frequently attack India's financial systems.

Critical Infrastructure Risks: Cyber intrusions endanger national security by targeting essential services like energy grids, transportation, and telecom networks. The October 2019 attempted breach at Kudankulam Nuclear Plant exemplifies this threat.

Financial Sector Vulnerabilities: Fraudsters employing money mule schemes or extortion tactics pose severe risks to Indian banks. Attacks on digital payment platforms and banking apps can trigger massive monetary losses, identity theft, and eroded public trust, as seen in March 2020 when hackers stole $2 million from City Union Bank via SWIFT.

[32] Assessing vulnerabilities in the Indian banking sector https://www.pwc.in/research-and-insights-hub/assessing-vulnerabilities-in-the-indian-banking-sector.html(08/2024)

Data Security Challenges: India's digital expansion has amplified sensitive data storage, escalating breach risks where unauthorized parties access confidential information. The May 2021 leak of 190,000 CAT exam candidates' personal records demonstrates such vulnerabilities.

Cyber-Espionage Threats: State-sponsored digital espionage targets India's diplomatic, economic, and defense sectors. The 2020 Operation SideCopy incident revealed Pakistani operatives phishing Indian military and diplomatic personnel.

APT Complexities: Sophisticated, prolonged cyber campaigns by hostile groups infiltrate networks stealthily. As evidenced by February 2021's Red Echo report, China-linked APTs compromised India's power grid using advanced malware.

Supply Chain Vulnerabilities in the Banking Sector:

Within India's banking industry, supply chain weaknesses refer to cyber risks introduced by external vendors, technology firms, fintech alliances, and outsourced service partners. As financial institutions increasingly depend on third parties for IT solutions, cloud platforms, payment systems, security products, and customer-facing applications, the sector's collective cybersecurity resilience becomes dependent on its most vulnerable component.

Banks employ third-party software for core banking, customer relationship management, loan processing, and other functions. If these programs are vulnerable or compromised, attackers could get access to the bank's internal network. Cloud-based solutions are commonly utilised to store consumer data and manage banking operations. A vendor's cloud environment that is misconfigured or unsecured (for example, open storage buckets or inadequate API access control) might result in large-scale data breaches. Banks frequently outsource IT maintenance, cybersecurity monitoring, and call centre operations. These contractors may not adhere to bank-level security measures, leaving them open to insider threats and credential theft.

Banking-as-a-Service (BaaS) and open banking models rely on APIs to communicate with fintech platforms. Poorly secured APIs or insufficient verification of fintech partners might provide unauthorised access to transaction data and result in API-based data breaches. ATM and POS hardware suppliers and software integrators might pose concerns if their systems are out of date or compromised. Supply chain attacks on these devices may enable attackers to steal card information or influence transactions.

This term describes vulnerabilities in operational technology infrastructure utilized by both public and private sector entities. Malicious actors can exploit these weaknesses to infiltrate connected networks and disrupt critical services, potentially causing severe operational impacts. A notable instance occurred in December 2020 when hackers targeted SolarWinds' network management software, compromising several Indian institutions, including the National Informatics Centre (NIC), Bharat Heavy Electricals Limited (BHEL), and the Ministry of Electronics and Information Technology (MeitY).

Current Cybersecurity Programs: The National Cybersecurity Policy outlines its primary objective as creating a secure digital environment for citizens, businesses, and government entities. It specifies comprehensive goals and methodologies for safeguarding online data, reinforcing cyber infrastructure, enhancing threat prevention/detection capabilities, and minimizing damages through coordinated institutional, human, procedural, and technological measures.

The Cyber Surakshit Bharat Program was launched to establish security protocols and educate government Chief Information Security Officers (CISOs) and IT personnel about cybercrime countermeasures.

The Indian Cyber Crime Coordination Centre (I4C) provides centralized resources to facilitate coordinated law enforcement actions against cyber offenses, fulfilling its designated operational mandate.

Its 7 elements are mentioned below[33]

●RBI's Cybersecurity Framework for Banks, 2016

●RBI's IT Examination (ITE) and Cyber Drills

●Directives for CERT-In (Indian Computer Emergency Response Team)

●The NCIIPC (National Critical Information Infrastructure Protection Centre)

●The threat analytics unit for national cybercrime.

●National website to report cases of cybercrimes.

●Center for the Training of National Cybercrime.

●An organizational unit for the administration of ecosystem management of cybercrime.

●National Centre for locating Cybercrime and innovation.

●On the national level, the ecosystem of the cybercrime forensic laboratory.

●Interpol and regional cybercrime investigation team Internet gateway.

Common Supply Chain Vulnerabilities in Banks:

●Third-Party Software Vulnerabilities: Flaws in bank-owned software developed or maintained by a vendor. Open-Source Dependencies: Risks posed by vulnerabilities in open-source components integrated into the bank's or its vendors' systems. Attackers implant harmful code into legitimate software upgrades provided by suppliers.

●Weak Vendor Security Practices: Vendors with inadequate cybersecurity measures are easily penetrated, allowing access to the bank's systems. Banks may have limited access to their vendors' security postures and the security practices of their subcontractors (fourth-party risk).

[33] https://theprayasindia.com/editorial_analysis/06-january-2024-the-hindu/(06/2024)

●Insider Threats at Vendors: Malicious or negligent personnel within a vendor organisation can deliberately or unintentionally damage the bank's data or systems.Cloud Service Vulnerabilities: Misconfigurations or security flaws in cloud services utilised by the bank or its vendors.Data Security Flaws by Vendors: Vendors mishandling or insufficiently protecting the bank's data.

3.5 Cybercrime and society[34]

The Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre), launched in 2017, aims to create a secure digital environment. Its primary functions include identifying botnet infections across Indian systems and notifying affected users to facilitate malware removal, thereby preventing further compromises. Alongside collecting and analyzing cybercrime data, CERT-In (MeitY's Computer Emergency Response Team) issues regular cybersecurity alerts.

Critical Information Infrastructure (CII) refers to systems whose disruption could severely impact national security, public health, safety, or economic stability. The NCIIPC protects such vital infrastructure across sectors like energy, finance, telecom, transport, government, and defense establishments.

The Defense Cyber Agency (DCYA), the armed forces' specialized cyber unit, handles digital security threats. Its operational capabilities include offensive cyber operations like system penetration, electronic surveillance, data retrieval, cryptographic solutions, and countermeasures against cyber threat actors.

Authors from diverse fields provide distinct insights on cybercrime's influence on society: 1. criminologists and sociologists: Focus: Examine cybercrime as a social phenomenon, including its origins, evolution, and societal implications. Key Perspectives: They investigate how the digital age alters traditional crime, develops new types of deviance, affects social connections and trust, and poses problems to law enforcement. They also discuss the function of social engineering and the spread of vulnerabilities via online platforms. Cybersecurity experts:Focus: Highlight the practical and technological consequences of cybercrime for individuals, businesses, and vital infrastructure.Key perspectives: They emphasise financial losses, operational disruptions, data breaches, privacy violations, and the importance of strong security measures, risk management, and public awareness.

Cybercrime and Society:-

Criminal activities target the very vein of the modern world entrenched in Internet and the high speed of data and information transfer through computers. See, hackers, in the most literal sense of the word, often

[34]International Journal of Management, It & engineering, Vol. 8 Issue 10(1), October 2018(o6-2024)

target people who cannot be considered technologically savvy, yet increasingly are immersed In today's digital era, the internet plays an increasingly central role in both professional and private spheres of life. With regards to this level, cybercrime is understood as the use of advanced skills obtained in the IT sector to deceive other individuals into revealing their SSN or any other account details as well. As for the victim, in some cases it is possible to refund the money or even recreate the stolen identity; however, the incident often causes the victim great psychological trauma and makes them mistrust the Internet and other achievements of the technological age. As such, the cybercriminal denies the latter many of the possibilities that the contemporary data market offers. During the first three quarters of 2017, Indian organizations experienced cyberattacks at a frequency of one every ten minutes. According to CERT-In (India's Computer Emergency Response Team), international cyber offenses totaled 27,482 incidents globally that same year. Such are the viruses and ransomware, phishing, and site incursion. Cybercrime experts spoke to the ToI regarding Digital India and similar campaigns and said: more people are now going online therefore the necessary equipment has to be installed before and or cybercrime has to be stopped. as cybercrime usually has very high statistics according to the data displayed this year the upcoming statistics will most undoubtedly increase. As per the insights of cybercrime expert Mirza Faizan TOI came to know that the government is in a process to reduce such rates of cybercrime, apart from this, businesses and individuals both have to be ready with a strong and capable team to stop such Types of crimes. The speaker proceeded to say that although the government is doing something, it is ineffective because hackers target hundreds of various systems and enterprises and all of them need to be ready. It is noteworthy that in the last 3.4 years 1. Thus, the total cyber-crimes registered was calculated, out of which 71 lakh cases were recorded in India.It is expected that by the end of December, the general crime will be more than fifty thousand owing to the fact that the current Offset figure is at forty-seven thousand two hundred and eighty-two. The recent years specifically the past three years have experienced a rise in ransomware attacks. Here, the attacker wants some form of monetary compensation; otherwise, information about the victim will be shared. Here, the attacker ‘chunks down’ the communication channel and demand money in ransom or else they will post the particulars of the victim. The attackers demand bitcoins, virtual money, as the ransom; it is wise to establish a safe mode of handling such kind of payment.

Impact of cybercrime on individuals, businesses, and society[35]

Another growing crime that is breathtaking in its rate across the world is computer or cyber-crime. Pc related crimes on the other hand have risen by an alarming forty percent ever since the coronavirus outbreak, the FBI has reported, PR Newswire. This increases infers that there is need for enhanced awareness and covering as a precaution against cybercrimes.Cybercrime is potentially catastrophic in as far as it destroys individual and corporate reputation, embezzles money and steal individual’s identity. Moreover,

[35] https://www.linkedin.com/pulse/impact-cybercrime-individuals-businesses-society-join-welance/(09/2024)

cybercrime affects several areas of society such as the economy is negatively affected, there are threats to national security, and social issues such as cyberbullying and harassment are promoted.Looking at Norton's study, he realized that 55 million consumers were affected by identity theft in 2021 alone. Once issue of whether or r company are going to be a statistic and become a victim of a cyber-attack that statistic is increasing. The good news is that there's action can take to protect r firm and rself. This article will discuss the consequences of cybercrime and what has been done to correct this problem in terms of the individuals, businesses, and society at large; It will also address ways on how to protect oneself in the computerized world by performing preventive measures.

3.5 Cybercrime's Impact on Various Entities: The digital age has escalated cybercrime risks for individuals. Advanced cyberattacks now expose people to greater dangers of monetary theft, personal data compromise, psychological trauma, and damage to their public image.

1. On Individuals

Monetary Damages: Cybercriminals frequently cause financial harm through phishing schemes, system intrusions, and malicious software designed to steal banking credentials, credit card information, and account passwords. Such fraudulent activities often result in immediate monetary losses that prove difficult to recover.

Identity Compromise: A severe consequence of cyber offenses involves the theft of personal identifiers including social security details, license numbers, and birth dates. Criminals exploit this stolen information to create false identities, obtain fraudulent loans, and conduct illicit transactions using victims' legitimate identities.

Financial loss, together with severe legal and administrative repercussions, may ensue from this. Emotional stress: Cybercrime is more than a matter of losing money or having one's identity stolen; it also entails emotional harm. Crimes in the virtual space often leave people to be filled with fear and tension because they and their data are vulnerable. This could, at some time, be injurious to one's mental health since the isolated person is reluctant to seek assistance. Reputational damage: lastly, the impact that cybercrime has on a person is the damage done to his or her reputation. It puts the criminals at the receiving end since they are likely to post material on the websites that people know has been stolen from them; thus, a decline in their credibility and loss of public trust. Other consequences of reputational damage include difficulty in securing a source of income, especially when one finds it difficult to get a job or even retain one. Direct Theft: Cybercriminals can gain unauthorised access to consumer accounts and steal funds by conducting fraudulent transactions. Unauthorised Card Usage: Cybercriminals utilize compromised payment card details to conduct fraudulent transactions without the cardholder's authorization. Schemes & Fraud: Customers might be duped into freely transferring money to criminals using social engineering techniques like as phishing or "digital arrest" schemes. Recovery Costs: Even if funds are recovered, users

may have to pay fees for challenging fraudulent transactions, replacing cards, and dealing with the aftermath of cybercrime.In India, cyber fraud losses increased to ₹177.05 crore in FY24.

2. On Banking business

Financial loss: Computer crime and especially the offence against the small and medium sized companies presents a devastating impact on the balance sheet. Such an attack results in loss of money, product ideas or consumers' information; and regaining such items may be costly. Since cybercrime financially impacts organizations, organizations may be forced to close in some circumstances.

Reputational harm: Actually, cybercrime is something that can significantly and irreversibly damage a company's reputation. Forgot customer information is a common problem where, due to a successful cyberattack, Customers may question an organization's data security competence, potentially resulting in reduced profits, attrition of longstanding clients, and diminished market position.

Legal ramifications: In this case cybercrime can have astrategic legal implication to a firm in that it can lead to the firm being charged with crime. Data breaches trigger legal charges, fines and penalties though prevalent in sensitive industries such as financial and medical industries.Intellectual property loss: It means that not only trade secrets as well as patents are among the types of IPR that might be stolen by cybercriminals from firms. Generally, such losses may prove fatal to companies, especially those which rely a lot on research and development. Such incidents can result in declining revenues, reduced business prospects, and shrinking market presence, potentially threatening the organization's long-term viability. Financial institutions often face extortion demands to regain control of compromised systems and information. Regulatory Consequences: Authorities may impose substantial fines for violations of data security laws following breaches.Client Restitution: Banks frequently must compensate customers affected by fraud or identity theft stemming from cybersecurity failures.

3. On Society

Economic impact: Cybercrime can possibly affect the economy to a large extent depending on the type of operation. Thus, it may lead to direct economic losses to people, firms, and states. The expenses may include recovery of lost data, repairing the existing damage, and preventing future advances. Besides, it may demoralize customer's confidence in the authenticity of online transactions hence affecting the sale and revenue of companies. Cybercrime also results in loss of Intellectual Property; this is a negative impact since industries' innovations and competitons are affected.National security concern: It is a known fact that cybercrime poses a great danger to all nations, which creates more concern on issues to do with national security. Maneuvers towards military and governmental structures can endanger private information and

disrupt various processes. Cybercriminals will also be able to use the technology to obtain state secrets, spy and sabotage essential aspects of society from transport to power. Another application of political and ideological motivations is also observed in cybercrime since it negatively impacts society. Impact on public safety and healthcare: Cybercrime can pose a threat to any of these two fields of study. Offenses against medical facilities may be lethal since they can threaten people's independent data and disrupt health services. Other manifestations can also affect the safety of people through assaults of critical infrastructures including transport systems and emergency services. Technology may also be as a tool for cyber criminals to try and steal identities which is very detrimental for those who are affected financially. Systemic Financial Vulnerabilities:Ripple Effects: A significant cyber breach at a major financial institution can trigger widespread disruptions, potentially compromising interconnected banks and jeopardizing overall economic stability. Such digital threats may undermine investor confidence, causing market fluctuations and broader economic repercussions.

In conclusion, digital offenses profoundly affect banking customers, extending beyond financial damages to impact psychological health, personal security, and confidence in online financial services. Financial institutions and governing bodies must emphasize customer safeguards through comprehensive security protocols, preventive awareness initiatives, and efficient resolution mechanisms.

3.6 Impact of cybercrime on the Indian economy: -

India's expanding digital economy and increasing technological dependence are making it a prime focus for cybercriminal activities. The nation's sizable population, rising internet adoption rate, and developing digital infrastructure have made it an ideal environment for cybercrime activity. Therefore, comprehending how cybercrime affects the Indian economy is of utmost importance.

Economic impact[36]:

1. Financial loss and damages: – cybercrime does lead to severe monetary losses and victimization of individuals, businesses, and the economy of India. The following are some financial effects of cybercrime in India: The following are some financial effects of cybercrime in India:

a. Direct Financial Losses: Cybercriminal acts include fraudulent transactions or money theft or unauthorized access to bank accounts; thus, imply direct financial loss. In many instances related to financial crimes, people and organizations experience negative financial implications.

b. Indirect Financial Losses: Cybercrime occurrences that may not directly lead to a financial hit, they will cause reputations to be damaged and investors to lose their confidence and the customers as well. Such factors can influence the ways of acquiring customers, conducting corporate activities, and the overall economic growth processes.

[36]Tripti Jaiswal, International Journal of Creative Research Thoughts (IJCRT) Volume 11, Issue 7 July 2023, www.ijcrt.org. (08/2024)

c. Legal and Regulatory Costs: Many organizations experience cybercrime, leading to expenditure in legal procedures, investigation, and compliance. It intensifies the financial 2. Operational disruptions and efficiency declines: Cyber offenses negatively affect both national economies and individual enterprises by interrupting business continuity and a. Service disruption and downtime: Hacking and Malware can lead to complete unavailability of networks, websites, and online services, for instance, through a DDoS attack. This results in reduced efficiency, dissatisfied customers, and lost revenues.

b. Operational Delays: One of the consequences of a cyber threat is that it is likely to disrupt the normal activities of a firm, for instance, in its supply chain, manufacturing or delivery of services. This leads to economic wastage through hindrances in the provision and distribution of goods and services.

c. Business Continuity Costs: Managers use resources to mitigate cyber risks through investing on cybersecurity, backup systems, and other disaster recovery frameworks. Such costs also aggravate the total financial loss of cybercrime.

3. Economic Espionage and Theft of Valuable Intellectual Property (IP): The economy becomes severely damaged by cyber criminals that raid its IP and perpetrate economic espionage regurlarly. Among the effects are:

a. Intellectual Property Theft: Cybercrime takes valuable information, company secrets and research outcomes and this comes at a cost to companies. This hampers innovation in technologies and steadily declines the competitive edge.

b. Piracy and Counterfeit Goods: Organizations involved in the sales of software, entertainment products or pharmaceutical products, for instance, are some of the benefitting parties since they lose their income to fake products as a result of online sales.

c. Economic Impacts on Industries: Such activities as trade secrets theft and economic espionage cause damage to specific industries of developments by constraining options for growth, investment and employment opportunities. Business sectors such as, technology, Research and Development and the creative industries are most vulnerable to cybercrime.

4. Rising Cybercrime Expenses: Some of the impacts include; Due to the increase in the instances of cybercrime, the companies and the economy at large incurs the cost of enhancing the security of their systems. Among these expenses are:

a. Cybersecurity infrastructure: it is a necessity for organizations to ensure that they adopt strong measures of security which include firewalls, IDS, encryption and security software. Thus, these investments have had an effect of raising operational costs.

b. Workforce and Expertise: In the race against cyber threats, it is evidently expensive to create a workforce with adequate skills in cybersecurity and to procure specialist assistance from external sources. Hiring professionals in cybersecurity and offering training to the staff members leads to added costs.

c. Regulation and Compliance: Because of generally accepted industry trends and regulatory requirements stating that organisations must adhere to cybersecurity best practices, compliance costs have to be incurred. 85 Non-compliance with these regulations may lead to financial penalties or reputational damage for the affiliated organization.

The need to protect the banking industry from cybercrime:-

Security measures in banking, especially cybersecurity, have become very important in the current world. It becomes much more important because credit creation and credit securing constitute the nucleus of the banking business. These five key elements demonstrate why cybersecurity is crucial for banks and require urgent attention: • What is surprising is that it seems as if all people are using electronic money, that is, the credit and debit cards. In this case, need to ensure that all the protection measures in cybersecurity are employed to protect our identity and information.

• Through the cases of data breaches, the banking industry may become an industry that is hard to trust. That is equally a major concern to banks. The lack of proper cybersecurity can make a company vulnerable in a sense that their data can be easily leaked, thus, their clientele might

as well be looking for other places to spend their money.

• Essentially, when a bank's data gets exploited, often lose cash and valuable hours. Recovering from the same can also take much time and energy to accomplish. If would involve endorsing statements, suspending cards, and watch out for any problems.

• On the wrong side, our information is as good as dust, as our privacy can be invaded extremely in a way that is unprintable. Even after cancelling compromised cards and resolving fraudulent transactions, criminals can still exploit sensitive cardholder data for identity theft and personal reputation damage.• Banks are relatively more sensitive than other types of undertakings. That is the cost banks have to incur for keeping types of personal information that are as sensitive as that. Cybercrime threats are serious when if measures were not being taken r bank data is likely to be at risk.

Three risks presently associated with banking on the web:-

• Additional dangers posed by mobile apps: Smartphone applications have it that more individuals open their bank accounts through the gadgets. These people do not usually have appreciable security, there is a significantly improved probability of an attack. To prevent the perpetration of a crime, the banking software solutions needed to reside at the end-point.

• Breach incidents at non-affiliated entities: They have been forced to use third party network and shared financial system while banks have upped their defenses. The attackers can easily penetrate these if these are not as secure as the bank.

• A higher chance of cryptocurrency hacks: It also pointed out that hacks have risen in the new-age assets such as cryptocurrencies besides the traditional ones. Thieves have a higher probability of procuring large

quantities of this currency because the chain is oblivious to how to apply cybersecurity software for banking in this volatile space. Especially when its value skyrockets.

Using secure software to fend off threats. [37]:-Given the present threats that are comprised under the large umbrella of internet security, it is advisable that should consider replacing your current security software or it might be time to consider upgrading it. These are some tells that can be put into consideration in the field of developing banking software.

1. Security audit: However, to execute any new software on the organization's cyber security, an assessment is required. The review also looks at the pro's and con's of the current alignment of the business. It also provides recommendations which may help reduce costs and achieve the right fund allocations possible.

2. Firewalls: Applications are not the only part of a cybersecurity banking setting and therefore, every component should be enhanced. To prevent cases of assault, the right hardware is also required as well. This approach enables bank security systems to intercept suspicious activities before they spread across networks. Protective software like antivirus and anti-malware programs– our firewall is updated and this makes r security better, but the assaults will not be stopped without new antivirus and anti-malware applications. Particularly, one can come across a situation where the most recent virus signatures and rules may not be incorporated in the old software. Therefore, it can miss a potentially fatal blow on r system possibly by a virus or any other malware.

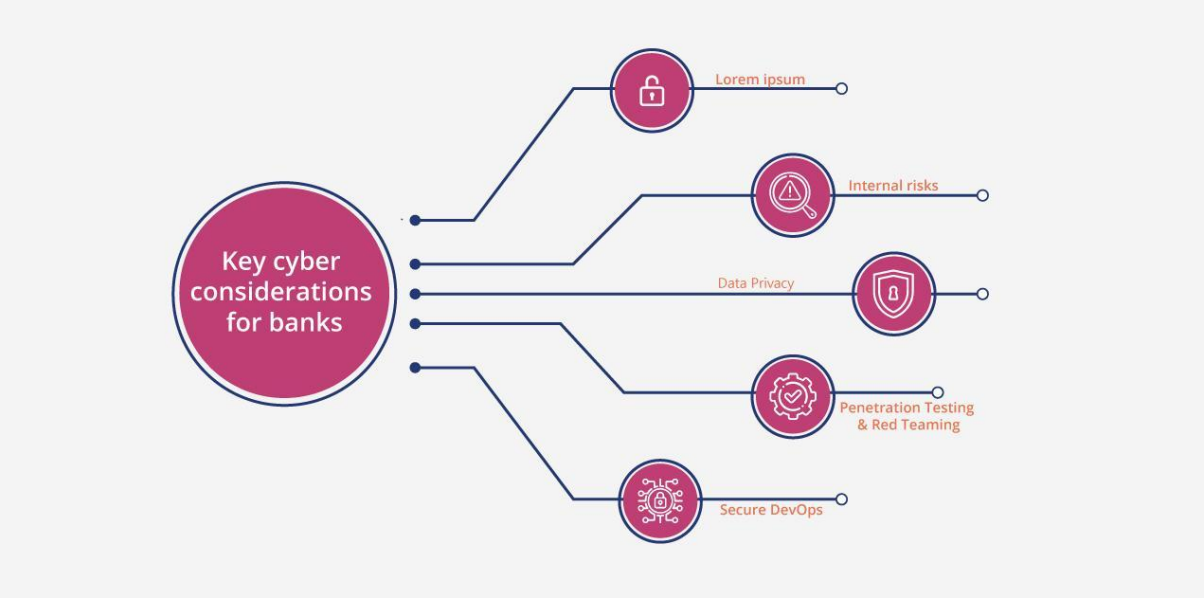
3. A word of advice or caution for banking users of online or mobile apps is the use of multi-factor authentication, or MFA. Many people fail to change the password. If they do, they make slight changes. As a result of provoking an additional level of protection, MFA blocks hackers from gaining access to the network. For instance, using the customer's cell phone, deliver a six digit code.

4. Biometric Among these, the type of MFA that is considered to be safer even than the texted code is Biometric. Used in this type of authentication, one may be required to scan their retina, make a thumbprint or even facial recognition. While this kind of authentication has been employed by hackers in the past, it is more difficult to pull off.5. Automatic logout: Of course, if allowed, a user can stay signed in on many sites and applications at the same time. Therefore, customers can access their account details without repeatedly inputting login credentials during each session. That way, however, makes it more convenient for the attackers to obtain r records. Automatic logout has reduced this by reaching a user's account and expiring it after a few minutes or idle time.

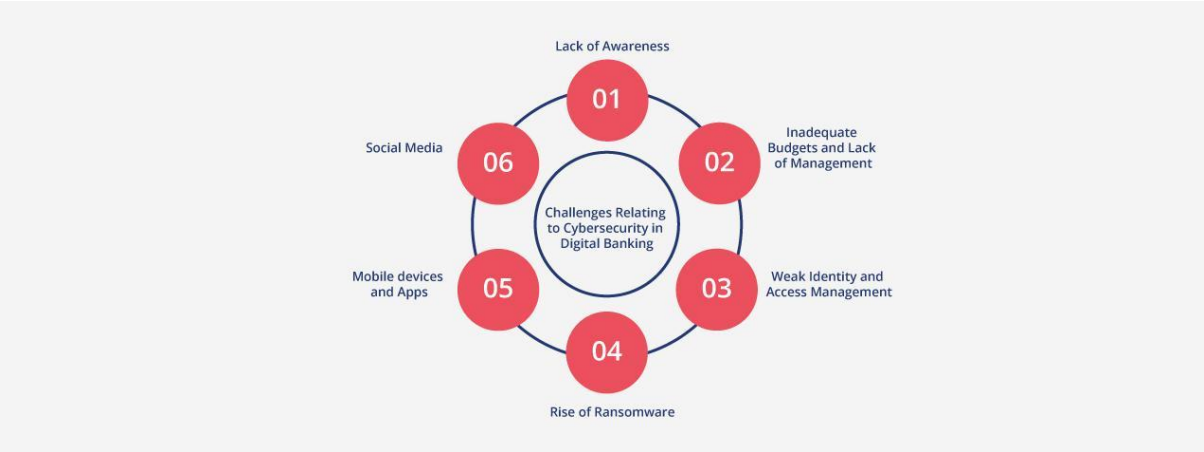
6. Education: Thus, if the above steps are taken, the sector of banking and other related industries can become more safe from cyber threats. But they cannot act when the users continuously download their data from unsafe web platforms or compromise the security of their login information. Education then becomes

59 [37] https://www.theglobaltreasurer.com/2019/09/25/the-importance-of-cyber-security-in-banking/

very significant for this reason. Consumers may change their behavior for such threats to inform them that banks have penalties for these weaknesses.



[38]



[39]

3.7 Challenges in Implementing Bank Cybersecurity: Several critical obstacles hinder effective digital security adoption in financial institutions. These include:

1. Ignorance

Currently, the level of understanding of cybersecurity among the population is rather low, and not many firms have invested significant amounts to improve it.

2. Lack of management, and still having very small budgets[40]

[38] Cybersecurity in banking https://www.knowledgehut.com/blog/security/cyber-security-in-banking(09/2024)

[39] Cybersecurity in banking https://www.knowledgehut.com/blog/security/cyber-security-in-banking (09/2024)

[40] Cybersecurity in banking https://www.knowledgehut.com/blog/security/cyber-security-in-banking(09/2024)

Climb's budget to cybersecurity usually receives insufficient attention due to its low priority. Actually, top management remains minimally concerned with cybersecurity and does not take a serious approach to the related support initiatives. This might be due to the fact that they provided exaggerated values to these hazards.

3. Access and Identities are not properly controlled

Identity and access management serves as the fundamental framework for cybersecurity infrastructure, not forgetting the recent upheavals instigated by hackers. can have authority and potentially enter a company's network with a single username theft. More has to be done in this respect, despite the progress that has been made.

4. A rise in ransomware

The new and growing threat of ransomware has been brought into our notice by some incidents of computer intrusion. Cyber criminals have begun employing some of the following tacters to be have bypass the endpoint protection tools that are focused on executable files.

5. Apps and Smartphones Modern banking institutions for the most part is oriented primarily

On the use of mobile devices as playing a primary role in materialization of business proposals. For this reason, the base is expanding daily, and the exploiters regard it as the best option. Mobile phones are gradually becoming the lovely targets of hackers because of increased mobile phone transactions.

6. Social Networks Hiring a hacker is easy today because of social media thus making the threat

Higher because more hackers are being employed. The customers with limited knowledge perform activities that make the public data available to hackers.

3.8 :- Digital Arrest :-

A digital arrest is the legal procedure of arresting someone suspected of committing a crime in the digital environment. These arrests may result in actual incarceration, although they are more commonly associated with restrictions on access to electronic devices, digital platforms, and networks. The emphasis is on preventing ongoing criminal activity online, seizing electronic evidence,and safeguarding the public from future harm. Common forms of crimes that result in digital arrests include:

●Hacking involves illegal intrusion into computer networks or systems.
●Phishing constitutes deceptive practices to acquire confidential data like login credentials or banking details by masquerading as trustworthy entities.

●Cyberterrorism employs digital attacks to cripple critical infrastructure while simultaneously instilling terror or advancing ideological agendas.

● Financial fraud refers to crimes committed online, such as credit card theft, identity theft, and Ponzi schemes.

3.9 Legal framework for digital arrests in India:

India's judicial system has steadily evolved to deal with digital crimes. The main laws and frameworks that govern digital arrests include:

1. The Information Technology Act (2000) serves as the cornerstone of India's digital legal structure. This legislation covers numerous cyber offenses, ranging from system intrusions and identity fraud to prohibited online material dissemination. It empowers authorities to examine, detain, and legally pursue cybercriminals.

Key provisions include:

- Section 66: Prohibits unauthorized system access and information theft
- Section 67: Regulates obscene digital content distribution
- Section 69: Grants government interception rights for national security threats or cyberterrorism investigations

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2. BNSS(2023) It establishes criteria for arrests, searches, and seizures, which are also applicable in cases involving digital evidence. During criminal inquiries, authorities can seize digital equipment, block financial accounts, or suspend access to online profiles.

3. DPDP ACT 2023: This proposed measure will tighten privacy safeguards and specify how personal data may be acquired, utilised, and processed in India. It will also specify penalties for data breaches and unauthorised access to personal information.

The government takes proactive measures

1. Indian authorities have implemented robust measures to combat virtual detentions and enhance citizen protection. By December 10, 2024, IC4 had blocked more than 1700 Skype identifiers and 59,000 WhatsApp profiles.
2. Multiple awareness initiatives and official advisories have been issued to educate citizens about fraudsters impersonating officials to extort money through fake digital arrests.
3. A collaborative framework with telecommunications companies now filters spoofed international calls displaying local numbers. Approximately 669,000 mobile connections and 132,000 device identifiers were deactivated by mid-November 2024.

Gaps in Current Legislation:

1. Lack of Specific Legislation. While multiple initiatives aim to enhance the process for handling digital arrests systematically, India's current legal system lacks explicit provisions for such measures. This legal void obstructs efficient cybercrime prevention. Resolving this necessitates statutory amendments to officially recognize virtual detentions, enhance procedural protections for digital offense suspects, and require specialized cyber investigation training for police to improve cross-departmental cooperation. Such updates are essential to modernize the judiciary for digital-era challenges and safeguard citizens against evolving threats.
2. Cross-border cooperation:- The cross-border nature of virtual detentions presents major obstacles, as perpetrators frequently exploit legal gaps by operating from territories with weaker cyber laws. This reality demands strengthened international collaboration, including uniform procedures for data sharing and mutual legal assistance agreements, to ensure successful prosecution of transnational cybercriminals. Unified global efforts and synchronized measures are essential to align legal frameworks and enable swift, coordinated responses to digital offenses worldwide.

The rising incidence of fraudulent virtual detentions in India presents significant legal challenges. Existing statutory provisions, while providing basic safeguards, prove inadequate against the sophisticated cross-border operations of these scams. Addressing this growing threat demands a multifaceted strategy incorporating stronger laws, global collaboration, enhanced police capabilities, and citizen awareness programs. Legal reforms must be accompanied by comprehensive public education campaigns to improve digital literacy and help individuals identify and avoid such fraudulent schemes. With these crimes continuously adapting to technological advancements, all parties involved must maintain constant vigilance and adaptability to protect communities from these deceptive practices.

3.10 Conclusion:

Today, most individuals provide preference to the banking facilities available in the online form. One is required to sign up for the account, and that calls for having to input personal details, but the services are executed on the internet and thus raise the issue of cybercriminal activities. This can be prevented or reduced through several steps, and if one has become a victim of cybercrime, they can be provided legal aid. Nevertheless, the evolving cyber threat landscape demands constant vigilance and flexibility. Financial institutions should persistently allocate resources to advanced protective systems, enhance threat detection mechanisms, and promote security awareness among staff and clients. Effective cybercrime prevention requires coordinated efforts between banks, specialized cyber police units, regulators like RBI and CERT-In, and government bodies.

The increasing complexity of attacks, particularly those leveraging artificial intelligence and innovative scams like "digital arrests," underscores the necessity for legal system enhancements. This may involve enacting new laws or amending existing ones to confront modern cyber risks and explicitly define the legal status of "digital arrests" and similar deceptive practices.

Chapter 4: Judicial notions and legal mechanisms in the banking sector

4.1 Introduction

In a world where clients primarily deal with banks digitally and contact them rarely, "digital trust" has quickly emerged as a key differentiator of the customer experience. Banks that provide a quick, safe, and easy-to-use digital interface will experience an increase in income; those that don't risk losing customers and losing value. Modern banking necessitates quicker risk assessments (such as real-time payments), thus banks need to find the ideal balance between promptly processing approved transactions and combating fraud.

4.2 The new cybersecurity measures announced by the RBI [41]:-

21 The Reserve Bank of India has rolled out several programs to bolster cybersecurity in banking and digital transactions. Major actions include expanding Additional Factor of Authentication (AFA) mandates to cross-border online payments and establishing specialized web domains ('bank.in' for banks and 'fin.in' for NBFCs) to strengthen digital security protocols.

AFA serves as a secondary security layer mandating user identity verification before transaction authorization, typically through One-Time Password (OTP) validation. Although currently mandatory for domestic digital payments, the RBI now requires AFA for cross-border e-commerce transactions. This expansion ensures international card payments from India maintain equivalent security standards as domestic ones, significantly reducing fraud potential.

Starting April 2025, the 'bank.in' domain will help customers authenticate legitimate banking websites, combating phishing scams. The complementary 'fin.in' domain for non-banking financial entities will similarly enhance platform credibility and security. Acknowledging financial organizations as primary cyberattack victims, the RBI enforces ongoing enhancement of protective and monitoring security systems. Regulated entities must implement comprehensive incident management procedures, backup solutions, and periodic vulnerability assessments to maintain uninterrupted operations during cyber incidents.

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20 [41] https://bfsi.economictimes.indiatimes.com/news/policy/explainer-what-are-the-new-bank-cybersecurity-measures-announced-by-rbi-governor-sanjay-malhotra/118029610#:~:text=By%20implementing%20stricter%20authentication%20standards%2C%20exclusive%20banking%20domains%2C,system%20remains%20secure%20and%20trustworthy%20for%20all%20users.

The Reserve Bank of India (RBI) plays a pivotal role in shaping cybersecurity regulations for India's banking industry. Although the RBI hasn't established a unified "cyber law," it issues detailed guidelines, directives, and frameworks that banks and regulated institutions must adhere to. These regulations derive authority from the Banking Regulation Act (1949), Reserve Bank of India Act (1934), and Payment and Settlement Systems Act (2007).

Here's an overview of the RBI's approach to cyber laws and regulations for banks:

1. Comprehensive Cybersecurity Framework:

   In 2016, the RBI developed a thorough "Cyber Security Framework in Banks" that outlines a structured method for banks to combat cyber risks. The framework emphasises: Board-Approved Cybersecurity Policy: Banks are required to have a well-defined cybersecurity policy that details their plan for combating cyber attacks, taking into account the complexity of their operations and acceptable risk levels. This policy should be unique from other IT or IS security policies.

   Cybersecurity Governance: The framework emphasises the role of the Board and senior management in overseeing and guiding cybersecurity initiatives.

2. Cybersecurity Incident Management: Banks must have comprehensive procedures in place to detect, respond to, contain, and recover from cyber incidents. This includes developing cyber crisis management plans. Banks must undertake continuous surveillance and real-time analysis of their systems in order to discover and respond to threats quickly.
3. Protection of Customer Information: Banks are held accountable for safeguarding the security and confidentiality of customer data, regardless of where it is stored.
4. Central Security Operations Centre (C-SOC): The framework encourages banks to develop and operate a C-SOC for proactive monitoring, threat detection, and incident response.
5. Baseline Security Controls: The RBI specifies various baseline security controls that banks must implement, including IT asset management, prevention of unauthorised software execution, secure configuration, network security, application security, patch and vulnerability management, user access control, data leak prevention, and management of removable media.
6. Advanced Threat Defence: Banks are expected to install advanced real-time threat detection and management systems, such as anti-phishing protection and secure web gateways. Vulnerability Assessment and Penetration Testing (VAPT): Regular VAPT exercises are required to discover and address problems in banks' systems.
7. Vendor Risk Management Third-Party Security Oversight: Financial institutions are required to monitor and mitigate digital security threats originating from external service providers and outsourced operations.

8. Cybersecurity Awareness and Training: Banks must conduct regular cybersecurity awareness seminars for their employees and educate customers about safe banking practices.
9. Reporting Cyber occurrences: Banks must promptly disclose severe cyber occurrences to the RBI and CERT-In (Indian Computer Emergency Response Team).

It is vital to note:

The RBI's rules are mandatory for scheduled commercial banks (except Regional Rural Banks), and they are frequently extended to other regulated organisations such as Urban Cooperative Banks and Non-Banking Financial Companies (NBFCs) with the necessary changes. The RBI takes a proactive approach to cybersecurity, routinely revising its standards to reflect the changing threat landscape. Adherence to the RBI's cybersecurity guidelines is essential for financial institutions to safeguard the banking sector's stability, ensure client protection, and prevent compliance-related sanctions.

4.3

OMBUDSMAN and cybercrime protection:-The Reserve Bank of India (RBI) has launched an integrated Ombudsman Scheme in 2021 to address bank customers' complaints about service problems. While the plan is primarily concerned with resolving complaints about traditional banking services, it also indirectly contributes to cybersecurity protection by addressing issues raised by digital banking and cybercrime. Role of the Ombudsman Scheme: Addresses Deficiency in Service: The system includes a wide range of banking services, including ATM/debit card operations, credit card operations, and electronic transactions. If a consumer experiences unauthorised transactions, data breaches owing to bank negligence, or failure to follow the RBI's cybersecurity rules, they can register a complaint with the Ombudsman. Awareness and Education: The RBI and Ombudsman offices run awareness campaigns to educate customers about cyber fraud and the safeguards to take when making digital transactions. This helps to prevent cyber mishaps. For example, the RBI Ombudsman in Jammu organised an awareness programme in October 2024 to teach people about cyber fraud and the grievance redressal methods available.The Ombudsman provides a free and efficient grievance redressal method. If a bank fails to respond to a client's complaint about cyber fraud or data security within 30 days, or if the consumer is dissatisfied with the bank's response, the customer may escalate the matter to the Ombudsman. Promotes Bank Accountability: The Ombudsman scheme pushes banks to improve their cybersecurity safeguards and respond more efficiently to client concerns about cyber issues. The fact that customers have redress for unresolved issues encourages banks to handle these situations seriously.

Role of the Ombudsman in Cybercrime Prevention:

1. The Ombudsman's major duty is to provide a free, fast, and fair mechanism for resolving customer complaints against banks. This comprises grievances that come from: Unauthorized/Fraudulent Transactions: If a consumer suffers a financial loss as a result of an unauthorised online transaction, phishing, or other cyber fraud, when the bank's lack of service is obvious, they may submit a

complaint with the Ombudsman. Non-compliance with the RBI's Security rules: If a bank fails to follow the RBI's cybersecurity rules, resulting in a client loss due to cybercrime, the Ombudsman can investigate such complaints.

2. Investigating Complaints: The Ombudsman conducts impartial investigations into complaints submitted, obtaining evidence from both the customer and the bank. This method assists in evaluating the legitimacy of the customer's claim and finding any negligence or fault in service on the side of the bank.
3. Issuing Awards: If the Ombudsman determines that the bank was lacking in its services, which resulted in the customer's loss due to cyber fraud, the Ombudsman may issue an award directing the bank to compensate the consumer for the financial loss sustained.
4. Systemic Improvements: In addition to addressing individual complaints, the Ombudsman's office learns about recurring concerns and systemic vulnerabilities in the financial system that affect cyber security. This could lead to recommendations to the RBI for policy changes and enhancements to the broader cybersecurity framework for banks.
5. Awareness and Education: By emphasising examples of cyber fraud and the need of secure banking procedures in its decisions and pronouncements, the Ombudsman indirectly helps to raise customer awareness of cyber hazards.

In summary, while the Ombudsman is not directly involved in investigating cybercrimes (which is the responsibility of law enforcement agencies), it does provide a critical avenue for customers to seek redress from banks for financial losses caused by cyber fraud, particularly when there is a deficiency in the bank's services or compliance with RBI guidelines. The Ombudsman serves as an important layer of protection for bank consumers in the increasingly difficult terrain of cybercrime.

4.4 Case laws:-

2018 Pune's Cosmos Bank Cyber attack[42]

In August 2018 the biggest heist planned was conducted on the Cosmos Bank branch in Pune that led to fraud $13.92 million embezzlement. Cyber criminals got into Cosmos Bank's software system, stole the cash, and transfer it to a bank in Hong Kong. Another case of cyberattack was established through legal action where Cosmos Bank filed the cyberattack picture to the cuber division of Pune India. Hackers belonging to a group hacked the bank's ATM server and got away with data of many Visas or Rupay card holders. In the Cosmos Bank cyber-attack, the centralised financial system of the bank was not the chief aim. It was shown that the holders still had no changes in their bank accounts or the balance in the accounts

[42] https://medium.com/@20dcs071/case-study-2018-punes-cosmos-bank-cyber-attack

and general statistics. The switching mechanism performs the function of being an interface between the unified banking system of the bank and the payment gateways.

The malware attack on the switching device contained numerous false notifications of various foreign Visa and Rupay debit card payment registrations. In two days, hackers breached ATMs located in 28 countries and withdrew Rs 78 crore; affected countries include Canada, Hong Kong, and some machines in India. An additional Rs 2. New methods of scams and instances such as the theft of 5 crore from ATMs in the Indian region were evident. Thus, 28,000 people made over 14,000 transactions for the 450+ cards in total in 28 countries.

4.5 Cyber-attack on Union Bank of India 2017[43]

A major July 2017 cyber intrusion targeting India's ATM infrastructure highlighted critical digital security weaknesses. The attack focused on Union Bank of India, among the country's leading financial organizations. Hackers gained access when an employee opened a deceptive email attachment posing as RBI communication. This infected document installed malware that harvested the bank's SWIFT authorization codes. Criminals then tried moving $170 million to a Union Bank account at Citigroup's New York facility, though the bank successfully intercepted these illegal transfers. While SWIFT confirmed several institutions compromises after the Bangladesh incident, it avoided directly identifying Union Bank. SWIFT representatives have continued dialogue with Union Bank's Chairman Arun Tiwari post-attack, according to Journal reports.

4.6 RBI phishing scam [44]

Cyber attackers executed a bold phishing campaign that even attempted to deceive the Reserve Bank of India. The scam emails, crafted to resemble genuine RBI correspondence, offered recipients a fake reward of Rs. 10 lakhs within two days for clicking on malicious hyperlinks. These counterfeit webpages precisely duplicated the central bank's official branding and web address structure. Unsuspecting victims were then prompted to disclose sensitive banking details, including account numbers, I-PINs, and passwords. In response, the RBI promptly issued an official alert on its website, cautioning the public about these counterfeit emails.

4.7 ATM Cyberattack 2018[45]

[43] https://ambimat.com/cyber-attacks-in-india/

[44] https://www.legalserviceindia.com/legal/article-7694-an-overview-of-cyber-crimes-in-banking-sector.html

[45] https://testbytessoftware.medium.com/major-cyber-attacks-on-india-2018-b83ef0bd2557

In mid-2018, criminals targeted Canara Bank by hijacking an ATM cash replenishment vehicle. Reports indicate hackers compromised over 300 accounts, stealing ₹20 lakh using skimming devices to extract card data from machines. The thieves conducted transactions ranging from ₹10,000 to ₹40,000 per account by cloning debit cards through these illicit devices. On August 5, 2018, Delhi police apprehended two individuals connected to an international card-skimming operation. Security Measures: Strengthening ATM surveillance and physical safeguards could prevent such data breaches.

4.8 Hacking of UIDAI Aadhaar Software [46]

2018 witnessed one of India's most significant data leaks when confidential medical records exposed one billion Aadhaar details. UIDAI's official breach disclosure revealed approximately 210 government-operated portals were compromised in this incident.The Aadhaar system infiltration revealed sensitive information including PAN numbers, bank IFSC codes, and personal identifiers, with illicit vendors offering Aadhaar records for ₹500 via WhatsApp. Additionally, unauthorized Aadhaar reprints were being sold for roughly ₹300.

4.9 Scam of SIM Swap [47]

Four Navi Mumbai-based hackers in August 2018, fraudulently obtained SIM card detail and blocked the users to siphon off four crore rupees from their bank accounts. They employed the online banking to affect their transactions. Sophisticated cyberattacks and the collected statistics should act as a powerful message to the other financial sectors that are still vulnerable to cyberattacks.

Prevention: The data needed for this kind of method is obtained from several public domains and then utilised improperly. Reducing the likelihood that someone may obtain malicious stuff about by sharing personal information with unidentified applications and URLs. Fraudsters lure victims into engaging in fraudulent activities by using their information in a variety of scams. Therefore, it is advised to confirm the legitimacy of the website before entering any banking information or other personal information, as scammers utilise phoney websites to obtain information directly from potential victims.

4.10 The Case of the Bank NSP [48]

A female banking trainee, previously engaged to be married, exchanged numerous work emails with her fiancé using company computers. After their separation, she fabricated emails impersonating Indian bar associations that corresponded with the man's international clients, utilizing the bank's systems for this activity. The affected company subsequently filed a lawsuit against the bank, citing significant client

[46] https://www.mygreatlearning.com/blog/biggest-cyber-security-threats-indian-banking-sector/
[47] https://www.mygreatlearning.com/blog/biggest-cyber-security-threats-indian-banking-sector/
[48] https://www.legalserviceindia.com/legal/article-7694-an-overview-of-cyber-crimes-in-banking-sector.html

attrition resulting from the incident. Since the emails were sent through the banks' server it was the banks' responsibility as ruled by the court. In the international environment, there is a requirement for cyber-controls or more accurately, the need for cyber-controls is on the rise; measures aimed at the encouragement of the cyber-laws to curb the menace of cybercrimes have become more important than ever. A large number of people experience infringements on their rights to privacy due to the fast-developing category of computer crimes. For the extermination of these offenses, it is now necessary to work out some effective cyber laws and further define and develop some leads. The most promising application of the Net can be considered electronic commerce, but this application cannot grow until such measures that will provide legislative support to it can be developed.

A study by a start-up supported by IIT Kanpur found that from January 2020 to June 2023, financial scams made up approximately 75% of cybercrimes in India.[49]

The Future Crime Research Foundation (FCRF), a non-profit startup based at IIT-Kanpur, recently published its comprehensive whitepaper 'A Deep Dive into Cybercrime Trends Impacting India'. According to FCRF's findings, online financial fraud constituted the predominant category at 77.41% of reported cybercrimes, with the organization noting this sector "represents a critical vulnerability encompassing deceptive practices in digital financial operations". The report further specified that "this classification incorporates credit/debit card scams, corporate email deception, internet banking fraud, along with the increasingly widespread UPI (Unified Payments Interface) fraud cases accounting for 47.25%".

4.12 Sumant Kumar @ Golu vs The State Of Bihar on 30 September 2022[50]

The inquiry is still ongoing. Co-accused Mantu Kumar mentioned all the petitioners; he was apprehended on the scene. The informant grabbed mobile sets, SIM cards, Debit Card, A.T.M Card, PAN Cards from the pocket of Track Suit of Mantu Kumar and also seized a bag that contained a Laptop, mobile sets, Bank passbook, and Adhar Card recovered that OPPO Mobile.According to Patna High Court CR. MISC. No. 50895 of 2021(4) dt.30-09-2022 and the FIR, numerous articles that demonstrate an organized cybercrime gang's involvement in cybercrime, bank fraud, and other crimes have been recovered from the petitioner Sumant Kumar @ Golu's home. The petitioners Sumant Kumar @ Golu, Shashi Kumar @ Shahi Mahto @ Babua, Pankaj Kumar @ Pankaj Kumar @ Tamoli, Raushan Kumar and Karu @ West Patna High Court CR. MISC. No. 50895 of 2021(4) dt. 30-09-2022 were all informed by co-accused Mantu Kumar to the police party. The Indiz dealer, who escaped the scene, was involved in other cybercrimes, including

[49] https://www.hindustantimes.com/business/financial-fraud-top-cyber-crime-in-india-upi-e-banking-most-targeted-study-101695036325725.html
[50] https://indiankanoon.org/doc/119243596/

extorting money from individuals in order to improve their test scores for the Bihar School Examination Board. They utilised to defraud shopping centre patrons in addition to committing bank fraud. Office will make sure that any flaws are fixed by the petitioners within the time frame stated above; if not, this Court will be notified of the situation.

4.13 Pallabh Bhowmick vs The Ombudsman on 30 September, 2022[51]

The case facts, as presented in the pleadings, reveal that the petitioner maintains a savings account with State Bank of India's Guwahati branch. After making an online purchase of Louis Philippe garments which he wished to return for a refund, the petitioner received a call from respondent no. 4, Papendra Kumar of Uttar Pradesh, later identified as the fraudster. Impersonating Louis Philippe's customer care manager (respondent no. 3), the scammer instructed the petitioner to download a mobile application to process a Rs. 4000 refund for the clothing purchase. Believing the call to be genuine, the petitioner installed the app, after which Rs. 94,204 was illegally transferred from his account via three online transactions. Initially, Rs. 64,017 was withdrawn through a payment gateway, followed by two subsequent transfers of Rs. 15,093 each. The stolen money was first deposited into a Federal Bank account before being redirected to other accounts.It was decided that the online transactions made on October 18, 2021, from the petitioner's bank account were fraudulent and unapproved. Respondent No. 2 was unable to prove the petitioner was negligent. As a result, the respondent No. 1's conclusion in its ruling of July 3, 2022, was illogical and could be overturned. This court further believes that the current matter will fall under the purview of clauses 8 and 9 in conjunction with clause 10 of the previously mentioned RBI Circular dated 06/07/2017. As a result, the petitioner will not be held accountable for anything.

4.14 Tinku Mandal vs The State Of Jharkhand on 30 June, 2017[52]

The financial and banking systems around the world are under threat from cybercrime and related offences. In the State of Jharkhand, a few areas have turned into hubs for cybercrimes and related banking offences carried out nationwide. A charge sheet has been prepared in the case after the petitioner was found guilty of the claimed primafacie charges.

Allegations have been made against the petitioner that he pretended to be a bank official and called various customers, obtaining their PIN and CVV numbers in order to take money illegally from their accounts. The written report, which served as the foundation for the filing of the First Information Report under Sections 419, 420, 467, 468, and 471 IPC and Section 66 (C) (D) of the Information Technology Act, disclosed not only the recovery of mobile phones from the petitioner but also the information gleaned from those phones

[51] https://indiankanoon.org/doc/116159756/

[52] https://indiankanoon.org/doc/149938560/

that indicated multiple OTPs used for transactions and money withdrawals. Allegations have been made against the petitioner that he pretended to be a bank official and called various customers, obtaining their PIN and CVV numbers in order to take money illegally from their accounts.The financial and banking systems around the world are under threat from cybercrime and related offences. In the State of Jharkhand, a few areas have turned into hubs for cybercrimes and related banking offences carried out nationwide. Alleged prima facie offences have been proven against the petitioner.

4.15 Pune Citibank Mphasis Call Center Fraud 2005 [53]

Facts: The following year, of US$3,50,000 was transferred online using the victim-client's Citibank credit card account details that were cloned to a number of fictitious accounts by four real USA clients. Thus, under the idea that they would help them solve some tough issues, the staff gained the consumers' confidence and received the PINs. They were not hacking their ways through by breaking passwords or bypassing firewalls, instead they were probing for the system. .Conclusion: The Court pointed out that in this regard the defendants are mobilized ex-employees of the MphasiS contact centres. This is the case since employee entry and exit triggers an inspection of the checks. Therefore, it can be deduced that the staff members must have memorized the figures. SWIFT service or the Society for Worldwide Interbank Financial Telecommunication was used to transfer the amount. The actual mode of operation involved the unlawful exploitation of the clients' electronic accounts. Hence, this case falls under the label of 'cyber crime.' "Any offense amongst the IPC where the computer is used with producing or receiving any electronic record can be likened to crimes involving with the written documents since the IT Act is broad enough in including such types of crime.

4.16 UTI BANK 2017 [54]

In February 2017, UTI Bank's website fell victim to a phishing scheme that compromised its systems. Customers received fraudulent Geocities links via email, soliciting sensitive login information. Subsequent IT investigations revealed the site administrator as Petr Stastny, with his contact details displayed on the webpage. Senior UTI Bank executives confirmed reporting the incident to the Delhi Police's Monetary Office Wing. The institution additionally engaged Extortion Watch Worldwide, the Melbourne-based primary global monitor of phishing activities, to assist in the case.

4.17 BPO Fraud 2004

Another event involving MphasiS, India, involved four call centre workers who obtained PIN codes from four of the company's clients, Citigroup, despite not having the proper authorization to do so. Under false pretences, several accounts were formed in Indian banks, and in less than two months, they were able to

[53] https://enhelion.com/blogs/2021/03/01/landmark-cyber-law-cases-in-india/

[54] https://www.legalserviceindia.com/legal/article-3073-cyber-frauds-in-the-indian-banking-industry.html

move money from Citigroup customers' accounts to these accounts by using their PINs and other personal data.

Although the cyber fraud case happened in December 2004, the Indian police were unable to identify the perpetrators and make an arrest until April 2005. A tip from a U.S. bank allowed it to happen when the accused attempted to take money out of these fictitious accounts. Just $230,000 of the $426,000 that was taken was found.

4.18 Poona Auto Anillaries pvt ltd Pune v. Punjab National Bank, 2011. [55]

It is the case of the prosecution that on August 23, 2011, rs 80,10,000 disappeared from the accounts of Poona Ancillaries Private Limited, PNB, Pune. Concisely, some of the companies mentioned include Idea Cellular, metropolis, Reliance Infocom and the managing director of the company Manmohan Singh Matharu had his account hacked. He discovered that forty transitions from his account to other unidentified people accounts rout totaling Rs 2 lac were made without his permission. Therefore, Matharu registered a police complaint and also reported the issue to the officials of Pune PNB. Based on the provisions of the IT Act 2000, he also filed a complaint at the official level to the state's IT Department.

4.19 State Bank of India vs Rajesh Agarwal on 27 March, 2023[56]

The lead bank in JLF consortium State Bank of India filed a civil appeal no. 7300 of 2022 before the apex court challenging the order of Telangana High Court. The main defence that has been placed by the SC is that the Banks' actions when they declined credit facilities classified the borrower or its directors as ineligible and blacklisted them which resulted into civil and criminal consequences. In addition, as the aforementioned action is administrative in nature, the Master Directions should incorporate the natural justice principles—audi alteram partem, in particular. Therefore, natural justice as held by the Honourable Supreme Court was to be incorporated in the Master Directions.

4.20 Gurwinder Singh vs State Of Punjab And Another on 9 February, 2021

The petitioner in this case is accused of defrauding seven banks. There are also claims that several bank and government employees participated in the fraud. It must be acknowledged that the initial investigating officer in this case did not attempt to place the petitioner under arrest. The petitioner's father and brother are also accused of having taken out loans from many banks. The Superintendent of Police Investigation (Chairman SIT), Patiala, has submitted an additional status report that details the superficial investigation.

[55] https://www.rlegalcareercoach.com/top-20-cyber-law-cases--must-be-aware-of/

[56] https://www.khaitanco.com/thought-leaderships/Supreme-Court-clarifies-that-a-borrower-must-be-given-a-hearing-before-classification-of-its-accounts-as-fraudulent-and-the-banks

It does not address pertinent details such as the purpose of the loan, its disbursement and utilisation, repayment history, type of documents executed, guarantor status, execution of the mortgage deed, and documents produced in support of the loan that involve fraud.

4.21 Federal Bank Ltd vs V.M Jog Engineering Ltd. And Ors on 29 September 2000[57]

Consequently, purchasers cannot secure injunctive relief against financial institutions regarding irrevocable bank guarantees or letters of credit due to seller contract breaches. When vendors submit documentation specified in these financial instruments and the transaction appears compliant with contractual terms, banks are obligated to honor payment demands. Pursuant to Article 43 of the Uniform Customs and Practice (UCP), banking institutions must process encashment requests upon verifying that presented documents match those stipulated in the guarantee or credit letter without any modifications.

4.22 Tirupati Buildings and Offices Pvt. vs Reserve Bank of India on 1 July, 2019

The RBI states that a bank must notify both the investigating authorities and the RBI if it suspects a particular account to be fraudulent. Other banks must become aware of a fraud as soon as one bank reports it. In this regard, the RBI notifies banks of Cautionary Advisories (CA), which include information about the borrowers and linked parties in question as well as the methodology of the claimed fraud. This allows banks to proceed with caution when interacting with the businesses or individuals included in the CA. With a few exceptions, the Central Fraud Registry (CFR), a web-enabled database of frauds reported by banks, took the place of Cautionary Advice in January 2016

4.23 Ali Ibrahim vs The State of Kerala on 14 October, 2014[58]

The petitioner claims that some unidentified individuals who contacted him via phone, email, and other means have defrauded him out of roughly Rs. 68 lakhs. The petitioner gave the fraudulent individuals the money directly and transferred it through bank accounts after being convinced to do so by the individuals. The petitioner's trust was betrayed by convincing emails and websites under the pretence of involving foreign nationals, calling from and providing local and international phone numbers, showing the passport and other details of some foreigners, etc. The allegations in the Writ Petition reveal that the petitioner was first contacted by the alleged fraudsters via email. He was also lured into the transaction by promises of a large profit in a future business, and money was taken from him on multiple occasions, citing various justifications and excuses.

[57] https://indiankanoon.org/doc/28176/
[58] https://indiankanoon.org/doc/72673147/

4.24 A Russian's hacking of a U.S. bank in 1994[59]

A band of international hackers from several continents including the United States of America, headed by a ng computer programmer of St. Petersburg, Russia, got to the virtual walls of a large bank in the USA twenty years ago and started pilferage money surreptitiously. This was bank robbery of the new generation, the shared world of the internet; no mask over the face, no threatening message, and of course no weapon. This case began in July 1994 when many of the corporate bank clients complained that the sum of $400 000 was missing from all their accounts. The problem was immediately reported to the FBI by the bank personnel as soon as they learnt of its existence. With the specific target of business clients of the institution, its cash management computer system, which allowed passing of money from their accounts in other Banks all across the globe, seems to have been the most attacked. With the help of the communications network and obtaining legal user IDs and passwords of the site, the crooks in question were able to get into it. The virtual theft, which occurred in August 1994, and subsequent investigation of what is described to be the first Internet bank robbery, such as it was, became a critical wake-up call for both the police and the financial services sector and its security providers. The corrective action that was made by the victim bank was to strengthen up the security in the network. The Web security specialists got to know of the problem from media coverage though the breach did not touch the Internet. To its credit, the FBI began the process of extending its investigations abroad, and in the realm of cybercrime. It has also over the years acquired a portfolio of methods and instruments which it uses to head investigations into high-tech crimes within the nation.

4.25 International money launderer, 2021[60]

A Canadian national received an extensive 140-month federal prison sentence for conspiring to launder millions obtained through multiple financial fraud operations, including thefts orchestrated by North Korean cybercriminals. U.S. Attorney David H. Estes of the Southern District of Georgia confirmed that Ghaleb Alaumary, 36, from Mississauga, Ontario, was found guilty on two charges of money laundering conspiracy. U.S. District Judge R. Stan Baker additionally mandated three years of supervised probation following incarceration and ordered $30,703,946.56 in victim restitution payments. The federal penal system does not permit parole eligibility.

4.26 R v. Thompson[61]

In the case of R v. Thompson, the appellant originating from Kuwait had deceived a bank to transfer certain amounts in particular bank accounts in England. It was granted, but it was used in a restricted manner; for a prohibited kind of access. It was as expected, the 1968 Theft Act was wanted. The main issues of debate

[59] https://www.fbi.gov/news/stories/a-byte-out-of-history-10-million-hack

[60] https://www.justice.gov/usao-sdga/pr/international-money-launderer-sentenced-federal-prison-cyber-crime-conspiracies

[61] https://enhelion.com/blogs/2022/06/22/development-of-cybercrime-law-in-the-united-kingdom/

were victims' identification and their legal demarcation between Kuwait and England. The court, therefore, held that the identification of a human victim is mandatory before one could be charged under the Theft Act. But in this case, it was not the human mind that has been deceived, in fact what has been deceived was the computer system. This proved how unsuitable the existing system of justice was to address such scenarios where a computer was on the receiving end as a result of criminal acts perpetrated by others.

4.27 Bangladesh Heist, 2016 [62]

The Bangladesh Bank's reserves were stolen for $101 million, demonstrating the susceptibility of financial institutions to cybercrime syndicates. The efficacy of current methods in averting such accidents is called into question by this episode. Moreover, this cyber theft underscores the crucial necessity for strengthened international collaboration against digital financial crimes. In February 2016, cybercriminals who had obtained Bangladesh's central bank authorization codes submitted $1 billion worth of transfer orders to the Federal Reserve Bank of New York. The perpetrators attempted to move Bangladesh's reserve funds to accounts in the Philippines. However, a spelling error in the Sri Lankan charitable organization's designation alerted intermediary financial institutions, causing the complete termination of the fraudulent transfers. The hackers had inaccurately written the beneficiary institution's name. Many people in Bangladesh and elsewhere were shocked to learn that such a substantial sum had been stolen from national reserves. There are concerns raised over the nation's ability to safeguard its digitally transforming financial infrastructure. The prevailing Awami League government, which is implementing a "Digital Bangladesh Programme" to digitize several branches of the government, is now greatly embarrassed by the heist.

4.28 Cyberattack in China's ICBC, 2023[63]

Market participants have raised questions on the vulnerability of other mainland lenders to ransomware attacks as demonstrated by the ICBC break in, the largest bank globally by assets. Nov. 8 a New York unit of the Industrial and Commercial Bank of China Ltd had to pull out of the U. S. Treasury market after a ransomeware attack. The hackers demanded to be paid before they could allow access to a system and data, claiming they will shut down access. But when the bank will establish will the link it is not known. In light of a ransomware attack that ICBC experienced on November, eight; the organization pulled one of its units out of the US Treasury market.

[62] https://www.bbc.com/news/stories-57520169

[63] https://asia.nikkei.com/Business/Technology/China-s-banks-seen-as-vulnerable-after-ransomware-attack-on-ICBC

Chapter 5

5.1Conclusion

The hacking incident had an impact on the bank's whole operations and raised concerns about the consistency of its procedures. A reputational risk was evident in the rush on deposits totalling about Rs. 1000 crores. The bank used a number of change management strategies to oversee the turnaround. In order to allay customers' fears, the bank management was able to mobilize the entire workforce and create a sense of urgency. They also devised a plan that included technological solutions, investigation, and various balance sheet exercises in addition to reputation restoration and technological restoration in order to restore profitability and confidence, all of which helped to attract new business. Although it was a very tough and demanding effort, the bank was able to improve its reputation by growing business, therefore the year under review may be considered positive and productive.

5.2 Suggestions

Institutions must have a multi-layered cybersecurity plan that incorporates cutting-edge technology, stringent regulatory compliance, and ongoing education to successfully combat cybercrime in the banking industry. Vulnerabilities can be greatly decreased by putting strong security measures in place, such as multi-factor authentication, end-to-end encryption, and AI-powered fraud detection systems. To stop phishing and social engineering assaults, regular employee training and customer awareness initiatives are crucial. In order to exchange threat intelligence and react swiftly to new threats, banks should also work with law enforcement and other financial institutions. Banks can reduce the risk of cybercrime by

establishing a safe environment through the integration of technology with proactive policies and awareness.

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